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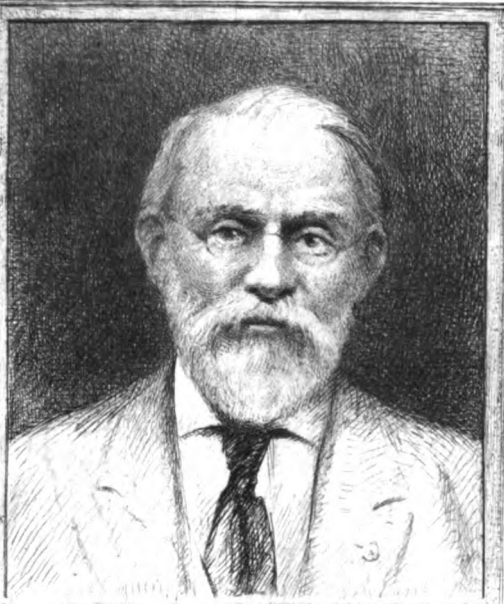
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Journal of the United Service Institution of India

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Journal of the United Service Institution OF India.

VOL. XXVI-1897.

CONTENTS.

	Page
Military Railways in War : Their Construction, Working, and Defence. By Major J. A. FERRIER, D.S.O., R.E.	1
Partisan Operations. By Captain R. G. BURTON, 1st Infantry, Hyderabad Contingent	41
Cavalry Field Hospitals. By Surgeon-Captain BRUCE SETON, 1st Central India Horse	53
The Improvement of the Present Organization of Transport in India. By Brigadier-General G. F. YOUNG	63
Occasional Papers—	
Some Notes on the Soldier's Sight	109
The Ventilation of Tents	110
The New Swiss Infantry Equipment	110
Intrenching Tools in the French Army	111
Supply of Ammunition in the Field in the French Army	112
Employment of Pigeon Posts	114
Some Notable New Publications	115
Jungle Warfare. By Major R. M. RAINEY, 12th Regiment, Madras Infantry	117
Some Considerations on the Subject of Musketry Fire and Musketry Training. By General H. R. BROWNE	128
The Encouragement of Fencing. By Lieutenant F. C. LAING, 12th Bengal Infantry	136
Duelling in the German Universities. By Captain G. H. COLOMB, 1st-4th Gurkhas	140
Optical Lantern Apparatus. By Colonel T. DEANE	144

	PAGE
A Portable Weigh-Bridge for Checking Cart Transport Loads. By Major M. MARTIN, R.E.	153
The Military Meaning of "Partisan": A Criticism by Major A. C. YATE, 2nd Baluchis	155
Some Foreign Articles of Special Interest—	
Aids to "Kriegspiel"	157
The Native Troops of Various European Powers	165
Bicyclist Corps	170
Pioneer Bicyclists at the German Manœuvres	172
Captive Balloons and Bicycles	173
A Contrivance for Measuring Distances	174
List of Medallists of the Institution	176
From Leh to Peking Across Tibet. By Captain M. S. WELLBY, 18th Hussars	177
The Best Method of Recruiting the Indian Armies. Prize Essay by Captain G. S. F. NAPIER, 2nd Battalion, Oxfordshire Light Infantry	199
Mule Litters and Doolies. By Surgeon-Captain BRUCE SETON, Indian Medical Service	241
The Best Method of Recruiting the Indian Armies. By Captain G. P. RANKEN, 24th Panjab Infantry	261
Some Notes on a French Cavalry Regiment of Chasseurs. By Captain V. B. FANE, 1st Punjab Cavalry	284
Increase of British Officers for the Native Infantry. By Major A. W. T. RADCLIFFE, 14th Sikhs	289
Partisans or Bandits? Reply by Captain R. G. BURTON, 1st Infantry, Hyderabad Contingent	291
Some Foreign Articles of Special Interest—	
Experiments in Crossing Rivers during the Austrian Cavalry Manœuvres, 1895	293
The New Swiss Rifle	294
A Magazine Pistol	295
Automobiles	295
List of Medallists of the Institution	296
The Fortune of War. By Colonel H. D. HUTCHINSON	297
The Best Method of Recruiting the Indian Armies. Second Prize Essay by Lieutenant W. K. SCHARLIEB, 5th Bengal Cavalry	317
The Bicycle as a Warlike Appliance. By Major J. L. KEIR, R.A.	356
A Comparison between the Infantry Musketry Course and the Artillery Practice Course. By Major J. A. H. POLLOCK, 3rd Sikh Infantry	371

	Page
A Plea for the Indian Fencing Association. By Lieutenant F. H. PIGOU, 1st Infantry, Hyderabad Contingent	377
Training for Volley Firing. By Captain C. E. BADDELEY, R.E.	380
Partisans and Bandits. A reply by Major A. C. YATE, 2nd Baluchis	382
Horses, Saddles, and Bridles. By Major W. H. CARTER, Assistant Ad- jutant-General, United States Army. A Review	385
On Snow Passes. By Captain S. H. GODFREY, I.S.C., Officiating Poli- tical Agent, Gilgit	388
Some Foreign Articles of Special Interest—	
The Czeipek Folding Bicycle	392
Training and Efficiency of the Turkish Army	393
Cavalry Tactics and Armament	394
List of Medallists of the Institution	396

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The Journal

OF THE

United Service Institution of India.

VOL. XXVI.

1897.

No. 126.

MILITARY RAILWAYS IN WAR: THEIR CONSTRUCTION, WORKING, AND DEFENCE.

BY MAJOR J. A. FERRIER, D.S.O. R.E.

My best introduction is for me to explain how this paper
Introduction. ever came to be written. During the
discussion of subjects for the prize essay
of this Institution, the President of our Council expressed a
wish for an essay on the best method of transport by light
railways or tramways in a mountainous country with fairly open
valleys and plateaux.

For reasons not necessary to discuss here, among which,
however, I must mention that the subject had already been
touched upon from a Transport point of view in the prize
essay for 1896, the Council decided not to open this subject
to competition.

Having had some little insight into the working of Military
Railways and the training of sappers for railway purposes in
war, I ventured to offer this paper on "Military Railways in
War: their construction, working, and defence," as a substitute
for the essay asked for by Sir Edwin Collen.

The subject has been treated at length in a general way
by soldiers of vastly greater experience than mine, wielding
pens with an ability and force that caused me to shrink for
months from my self-imposed task.

While still deliberating on the subject, I chanced to find my-
self engaged in a friendly exchange of ideas on railways in gen-
eral and military railways in particular with Mr. J. R. Bell, late
Consulting Engineer to the Government of India, who told me
that he had written a note on the subject. I immediately

offered him the few notes of my practical experience that I had thrown together, and asked him to read a paper at this Institution! Instead of accepting my offer, he generously handed over his note for my perusal and use, and the only return I can make for this handsome treatment at the hands of one who is admitted to be the master expert on military railways is to read his note as a preface to this paper.

Many of my hearers are doubtless familiar with the essays on this subject by General Sir Richard Harrison, with which, I regret to say, I have been unable to refresh my memory: the paper by the late Lieutenant-Colonel Robert Home, C.B., R.E., on the organization of the communications of an army, including railways, published in Volume XIX of the Journal of the Royal United Service Institution. Another paper published in the same volume on the German Railway Regiment by Lieutenant, now Major, H. E. Rawson, R.E., and Lines of Communication in War, by Colonel Furse,—not to mention the essays published with the July number of our Journal,—and a Treatise by Clarke on marches and the use of military railways: I shall refer to some of these authorities later on.

I wish to remark, however, that all these works lay stress on the necessity for military railways in modern war, and dilate on the best methods of making use of this powerful auxiliary to transport, assuming that a railway of some sort must be made. But none, so far as I am aware, have entered into the practical part of the question and dealt with the actual difficulties of preparation of material, construction, and working of the line in an enemy's country. Gouvion de St. Cyr says, "Il faut se bien persuader que toutes les difficultés de la guerre sont dans l'exécution."

The following is Mr. Bell's note to which I have referred—

The degree in which tramways or light railways will prove useful and economical for facilitating carriage of army stores across the frontier may, I think, be fairly gauged by a reference to the following considerations which I have sought, as far as may be, to divest of barren technicalities:—

For transporting a given load,—no matter what the source of power—whether that of draught cattle or otherwise,—the effort to be exercised may be divided into three main elements. These are—

- 1st.—The effort of haulage or propulsion which overcomes the resistance due to the class of roadway, *assuming it to be level*. In this we may include as inherent in the class of roadway (*a*) the normal axle friction of the vehicles and (*b*) the resistance offered by ordinary sinuosities.

2nd.—The effort of raising the load from bottom to top of each ascent.

3rd.—The effort, which may be a plus or a minus quantity, required for controlling the speed on descents. This is partly qualified by (c) the extent to which, at the bottom of each descent, momentum can be utilised to *rush* part of the next ascent.

2. The resistance offered alike to haulage and to descending momentum by the nature of the roadway can best be expressed (like the effort of ascending) in terms of the weight, *i.e.*, as equivalent to lifting a certain proportion of the gross load to a given time. In a well-kept first class railway, on the straight, the resistance of our first element equates $\frac{1}{2}$ per cent. of the gross load; on straight tramways it is probably $\frac{1}{2}$ per cent.; and under war conditions it is not safe to count on hurriedly-laid and hard-worked sinuous tramways upon a less resistance to haulage than 1 per cent. This resistance on a well-maintained metalled road like the Simla-Kalka is fully 2 per cent. Over soft, sandy or gravelly ground 10 per cent. is reached at times, but I think that with our ordinary appliances, such as grassing soft places with reeds, etc., this element ought not to exceed 6 per cent. On hard-worked cart-roads, through, *e.g.*, the Khyber Pass or the Gomal, and that an average 5 per cent. condition *on the level* may be relied on for cart-road communications in the calculations below.

3. The effort of ascending is measured by the gradient of the road, and it is not desirable that the ruling gradient should be steeper (including an allowance on long and sharp curves known technically as 'compensation for curvature') than 1 in 25, or 4 per cent. It is true that 5 per cent. and even 6 per cent. grades can be worked by what are known as 'adhesion engines,' 10 to 15 per cent. by rack-engines and 20 to 25 per cent. by stationary engines on rope inclines; but heroic expedients should be excluded as far as possible from our present object, which is mainly the carriage of heavy stores in considerable quantities. The 1 in 15 or $6\frac{2}{3}$ per cent. said to be used on French war tramways is probably only used for short descents and re-ascents known technically as 'momentum dips;' and as 1 in 25 is the Indian standard gradient for hill roads, it may serve here to bring out a clear comparison if we assume 1 in 25 'compensated' to be the normal ascent under consideration.

To further simplify comparison, we may assume that the ratio of tare to load, alike in carts and tram wagons, is that of our railway rolling-stock, *vis.*, as 1 to 2,—*i.e.*, 50 tons of vehicle carry 100 tons of goods. We may also assume that the antifriction conditions of axles, etc., both in carts and trams can be maintained in the same relative efficiency, and also that the same labour on maintenance which would keep a cart-road up to our 5 per cent. standard would maintain a 1 per cent. condition in a tramway.

4. Under these postulates the effort due to mere haulage on the level being 5 per cent. for carts, against 1 per cent. for trams, the same draught animals ought obviously to haul 500 tons along long level lengths of tramway against 100 tons on *kutchra* roads. Unfortunately, however, the lengths of absolute level are probably few, and

the best we can, in my judgment, hope for, in even easy country, would be an up-hill-and-down-dale ruling-grade of 2 per cent. (1 in 50). Here the tram effort is 2% for grade *plus* 1 for haulage, in all 3 per cent., against 2% + 5 on a *kutchā* road, in all 7 per cent., and the efficiency of the tram instead of 5 times, on the level, falls to $\frac{2}{7} = 2\frac{2}{7}$ times that of carts. Coming again to the 4 per cent. grades postulated above for open passes, the tram resistances are 4% + 1 = 5 per cent. against 4% + 5 = 9, and the tram's efficiency is $\frac{4}{9} = 1\frac{1}{3}$ times that of carts. Similarly on 6 per cent. grades we have tram 6 + 1 = 7 per cent. against carts 6 + 5 = 11. We may, I think, say broadly that the average efficiency of the tramway in economising draught cattle, if these are to be used, is at least 2 to 1 on rising and short undulating gradients, *where the cart-road is kutchā*. The comparison between a good metalled road and a good tramway is very different. On 1 in 25 the train shows 4 for grade and $\frac{1}{2}$ for haulage against 4 + 2, — an advantage of only $1\frac{1}{2}$.

5. On descents of any length the case is somewhat different. For instance, on a 6 per cent. grade an impetus of 6 — 1 = 5 has to be restrained by brakes or other retarding contrivances against 6 — 5 = 1 in carts. It is, however, in the nature of trams that they can descend gradients, with the vehicles coupled into trains, by dint of the force of gravity, whereas carts must have cattle in all cases. On our postulate a train of vehicles can obviously be worked down by hand with the aid of brakes on any long gradient steeper than the 1 per cent. on which the effects of traction and friction are assumed to balance. On this showing, in using cattle draught the trams would need enough cattle for 150 tons gross load on each grade ascending towards the front, against enough for but 50 tons (net weight of empty vehicles) on each counter-gradient; and there would also be some saving of time and effort in taking the cattle back 'light' down hill. The wear and tear of tram wheels and rails is considerable, as on steep grades many wheels must be 'spragged' or locked from rotating, leaving a mere balance of power to be controlled by hand brakes applicable at will.

There is little, if any, balance of advantage between trams and carts in using momentum at the foot of one grade to go up the next. A dip of 12 or 15 feet is the utmost that can be safely worked in this way by trams without locomotive engines, and it is essential to safety that, with or without steam, the 'dip' should be absolutely straight—and any curves required must be above the zone where free momentum is availed of.

Broadly, I think that for cattle draught, after allowing that we have to bring out the material of the tramway itself in addition to normal army stores, one-half the amount of men and cattle is an outside estimate as compared with carting, and that the saving may prove to be still greater on *bad ground*.

6. In saying what I have above as to cattle draught, I am by no means enamoured of it, and therefore proceed to discuss what can be done with steam. On steep grades the great objections to steam are (i) the enormous weight of the engine itself, and (ii) owing to considerations connected with 'the most economical piston-speed,' the most

efficient speed of *simple*, as distinguished from *geared*, engines is too high where great climbing power is needed. Suppose, for example, that an ordinary adhesion engine can easily take itself and a certain load up a 4 per cent. grade, 1 in 25, on which it can best utilise its maximum steam pressure at a speed of 9 miles an hour. If so, in one hour it could raise itself and its train (its 'gross load') 1,901 feet (4 per cent. of 9 miles) vertically, while the mere haulage effort would be equal, at *ex hypothesi*, 1 per cent. to raising the gross load an additional 475 feet, making the total effort equate lifting the gross load 3,376 feet bodily. Here, assuming the gross load to be 50 tons (say 20 tons of engine and 30 of train), the total effort would be $50 \times 2,376 = 118,800$ foot tons,—and it is clear that if suitable mechanical arrangements can be devised, we could, *with the same boiler-power*, either raise (a) 50 tons \times 2,376 feet at 9 miles per hour or (b) 75 tons \times 1,584 feet at 6 miles an hour or (c) 150 tons \times 792 feet at 3 miles an hour, the product being in each case the above hypothetical quantity of 118,800 foot tons per hour. That on the face of it presents no very obvious advantage either way until we come to consider the dead weight of the engine, which we assume at 20 tons in either case. Then we see that in (a) the paying work accomplished is only $30 \times 2,376 = 71,280$, while in (b) it is $55 \times 1,584 = 87,120$, and in (c) $130 \times 792 = 102,960$, increases of 22.2 and 44.4 per cent. respectively.

Nor is even this all, for either of the slow-moving 'geared engines' can equally safely descend the 9-mile run in one hour as the adhesion engine; so that where, *omitting stoppages*, the (a) engine does ten round trips in 20 hours, (b) does eight, and (c) five on the same 9-mile run. Hence (a's) total duty in 20 hours on the road, omitting that of taking down empties, is $30 \times 10 = 300$ tons, (b's) $55 \times 8 = 440$, and (c's) $130 \times 5 = 650$ tons, the sole extra cost incurred being for fuel, stores, and perhaps some extra wear and tear.

7. The principal difficulty in using geared engines is that of getting sufficient adhesion between the driving wheels and the rails, when we thus magnify the load at the expense of the speed. The Abt is the best of the many systems which use a central track rail, in whose teeth a 'pinion' geared down to a slow speed engages. This is not the place to dilate on the ingenuity and skill with which the Abt system has been gradually perfected. For the present purpose it is enough to point out that, as shown in a recent accident at home, it is distinctly unsuitable for rough laying and unskilled handling. It is a necessary part of the arrangement that the rack teeth are cut with mathematical accuracy and that the mean length of rail (whether the two opposite rails be equal, as on the straight, or different, as on curves) must be an exact multiple of the pitch of the rack's teeth. This mathematical accuracy not only involves very special care and consequent delay in constructing the line, but is open, under our normal geological conditions, to a further serious objection. Nothing in our case is more common than a landslip which either falls on to the road, and must then be dug away, or it falls from under the road, which must then be slewed over on to the solid, accepting such temporary curves and sinuosities as chance may afford. Effective slewing is a thing that the rigid relation between

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rails and rack-rails here in question does not permit of. Slewing a line is sure to either lengthen or shorten it and while the joints of an ordinary rail or tramway allow considerable give-and-take, that of the Abt construction is infinitesimal. Moreover, the rack does not lend itself in any case to curves of less than 100 gauges in radius, *e.g.*, 250 feet radius with 2 feet 6 gauge, while on adhesion lines emergent curves of 25 gauges are quite common. I am not sure either if a less gauge than 2 feet 6 can be arranged on any rack system. Speeds are workable with rack engines as low as one-third of that which befits simple adhesion and a consequent gain in effective load of cent per cent, with the same boiler-power on the same grades, is very nearly attainable.

8. Failing the rack, the only geared engine likely to suit our conditions is that known in America as a '*stem winder*.' These are very largely used in the United States for rough, steep, and temporary 'logging' railway, laid into the mountains for bringing down forest timber. I do not doubt, from what I am told by American friends, and indeed from the very nature of their work, that these are likely to suit us for military tramways better than anything else on the market, and if so desired I will be happy to procure details of their performances and design. The broad principle is that vertical cylinders work a horizontal longitudinal shaft which drives, at reduced speed by bevil gearing, all the wheels both of the engine and its tender. I do not expect that with the freest use of sand these engines can develop their best effect at much below the two-thirds of adhesion speed discussed as engine (b) above, but even so they promise complete adaptability to the roughest sort of plate-laying and close on 50 per cent. more duty than direct acting adhesion engines. Some very good results have also been attained on the metre gauge in Switzerland with M. Mallet's compounded twin engines, and again in Mexico with twin-Fairley engines, but I am satisfied that the 'logging-stem winders' are probably still better for the rough work now under discussion.

9. Another not unpromising treatment of steep ascents on a mountain line—that indeed contemplated in a scheme made in 1884 for plate-laying from Suakim to Berber—consists in seeking out facile plateaux alternating with occasional very steep inclines, such as 1 in 5 or 6, leading from plateau to plateau, and working these inclines by wire ropes and fixed winding engine. In these cases it is everything to push on the rail head;—and to 'bunch' our difficulties, in isolated inclines, may often prove far better in emergent work than disseminating a greater amount of effort over longer lengths. Rope inclines ought to be absolutely straight from top to bottom. It is said that an Italian engineer has safely adapted rope traction to a sinuous incline near Turin, but I have not seen it.* If the use of military tramways is seriously contemplated in India, the details and merits of this invention demand close and early enquiry.

10. As to the time required to make such a tramway, I can speak for the mere plate-laying that it can easily be kept up to three miles

* NOTE.—There is one with a curve in it near Bilbao.

a day, with any gauge up to metre—assuming that a decent road-bed is roughed out in advance. I am not prepared at once with an opinion how far it is wiser to lay once for all a substantial line that will last or a flimsy line, earlier ready, but earlier worn out. As the power of the engines follows the weight of the rails, I am distinctly inclined towards a fairly substantial job. A line that Dervishes can capsize bodily or roll up endways, as I hear once happened on the Nile, will want as many guards as a train of carts. I don't think that a less gauge than two feet six inches will suit our conditions.

There is some mistake in the recorded papers about the Sibi line which I am anxious to correct. Work began on the 14th day after the Council sat which decided to have the line made, and on the 115th day the line was opened through for traffic, 133 miles. Of the 101 working days, 13 were spent in a strike when the men refused to face the desert. The line is standard gauge. The work was embarrassed by having to finish off each class of second hand rails, etc., before another could be begun upon. Four or five considerable flowing canals were bridged with timber and some scores of distributaries, but dry depressions were negotiated temporarily by 'momentum dips' laid on the straight. The heaviest class of road laid had 84-lb. rails, 46-lb. chairs, and Australian iron-bark sleepers; and of this, as a test case, it was found practicable to lay $1\frac{3}{4}$ miles between 7 A.M. and noon.

11. My experience can offer a practical contribution to the solution of the war-railway problem, whatever be the gauge or weight employed:—

I.—All rails should come out in pairs, one longer than its fellow by the amount proper for the sharpest curve to be used. On the straight a long and a short rail are to be laid alternately on either side, while where curves occur the proportion of long on one side to short on the other is increased. But there is no delay required for cutting off rail ends. The difference in length is a matter of an inch or two.

II.—Metal sleepers, if used, must have their flat side down and hollow side up. The steel sleepers now in stock are the reverse of this, and when they come to be laid, packing them will cause serious delay.

III.—The standard points and crossings should exactly replace a certain length of standard rails.

12. I am quite sorry that this question has only come up so near the end of my service, as it would have given me very great pleasure to work it out, and in many ways I have, I think, quite an uncommon intimacy with the difficulties of the problem. If it could be arranged, and were desired, I should be glad to confer with the Military Authorities on matters of detail. In any case I can offer a rough outline of cost, etc., that may prove useful. The fundamental question is that of truck axle-loads: engine axle-loads are usually two-thirds heavier than those of the trucks. If, for example, 4 tons net load on a four-wheeled truck will suffice, the axle-load may be taken as 3 tons. This on a bogie frame resting on two four-wheeled trucks would carry a gun weighing 8 tons; and I would not push the multiple truck system farther in our case. The weight per yard of the rail should be 7 lbs. per ton of normal axle-load—*e.g.*, 21-lb. rails for 3-ton

axle-loads. The net weight of rails in tons per mile is found by multiplying that in lbs. per yard by $\frac{1}{4}$, but to allow for sidings and wastage $\frac{1}{2}$ may better be taken. It is not safe to reckon on sleeper fastenings, etc., weighing less than three-fourths the rails; so that 3 tons per mile for each lb. of rail per yard is a fair estimate for any such line. Thus a 21-lb. tramway with steel sleepers would weigh about 63 tons per mile complete and cost without rolling-stock or equipment, other than points and crossings, Rs. 6,500 a mile delivered in Calcutta or Bombay. The rolling-stock, etc., would add at least Rs. 2,500 a mile, so that we may say roughly that Rs. 3,000 per mile per ton of axle-load will give a sound if rough idea of the cost of any such line apart from works and carriage from the seaport to the front. The works for the up-hill-and-down-dale line we should want would not cost much more than a good *kutchra* road with easy turns and the same grading.

I give here the arithmetic of Mr. Bell's paragraph 6—

50 tons at 9 miles $\times 2,376 = 118,800$ foot tons @ 9 miles an hour.

$50 \times 2,376$ @ 9 miles per hour $= 75 \times 1,584$ @ 6 miles an hour,

150×792 at 3 miles an hour, or leaving the height to be climbed constant and varying the time.

A. 50 tons is raised 2,376 feet in 1 hour at 9 miles per hour.

B. 75 tons is raised 2,376 feet in $1\frac{1}{2}$ hours at 6 miles an hour.

C. 150 tons is raised 2,376 feet in 3 hours.

Assuming that each engine takes one hour to run back the 9 miles with empties, etc.—

In 20 hours A does $\frac{20}{2} = 10$ trips.

B does $\frac{20}{2\frac{1}{2}} = 8$ trips.

C does $\frac{20}{4} = 5$ trips.

To reduce the paragraph on work and duty to the factors with which we are most familiar, I make the following extract from Colonel Home's paper:—

"The Comte de Paris* has furnished a remarkable calculation on the provisioning of an army by wagons. He says one road will suffice for only a limited number of carriages; if several roads are available, the number of wagons must still be limited, otherwise the army cannot move.

A six-horse wagon will carry 2,000 lbs.; and the supply for each man per day, medical stores, ammunition and food included, may be placed at 4 lbs. per man.

Such a wagon will supply 500 men for one day, but if the army is a day's march from its base, it will only supply 250 men, for it must go back empty to refill at the base. If it is two days from its base, 4 wagons for 500 men are requisite, or 8 per thousand or 400 wagons for 50 thousand men. But if

* NOTE.—Louis Philippe Albert d'Orleans, head of the house of Bourbon, served on McLellan's staff in North America. He wrote "*Histoire de la guerre civile en Amerique.*"

the army of 50,000 men includes, as it would do, 8,000 cavalry and artillery horses (a low proportion), 100 wagons would be requisite to carry a day's forage or 400 if the army was two days' march from its base: total for the army 800 wagons horsed by 4,800 horses. But these wagons would be three days away from the base and one day there, consequently they would require 180 more wagons, horsed by 1,080 animals to feed them, and these would require 40 additional wagons and so on till we arrive at 1,020 wagons, say 1,000, horsed by 6,000 horses requisite to feed an army of 50,000 men two days from their base."

Comparison of camel power. Put this into camels each carrying, say, 400 lbs., we get 5,000 camels.

The Soudan Railway, a difficult tortuous line, with one incline nearly half a mile long of $\frac{1}{35}$ and several of $\frac{1}{30}$, could with its worst engine convey 12 loaded trucks each carrying 5 tons at a rate of 10 miles an hour: this is the equivalent of 336 camels—

$$\frac{60 \times 2,240}{400} = 336.$$

Assume for the sake of argument that a day's march is 15 miles, two days' would be 30 miles. We would therefore require $\frac{5,000}{336}$ trains travelling at 10 miles an hour to feed our army, or 15 trains per diem. Each engine could do two trips; so, assuming there is sufficient rolling-stock, we could feed our army with 8 engines, 180 trucks and 8 brake-vans—plus a certain reserve, say 2 engines, 1 brake and 20 trucks to begin with.

Fifteen trains a day is a pretty large order on an unorganised line, but I conjecture that by the time we could collect 50,000 men 30 miles beyond our field railway base, the organisation of our line would probably have been effected by an adequately trained staff. These figures are, however, only by way of illustration. I do not think Napoleon put more than 30,000 men on one line of advance across the Prussian frontier and Poland in the Russian Expedition of 1812. The 15 train limit need never be reached as explained in the footnote.*

* NOTE.—If a railway be provided, we can dispense with the wagons or transport animals on the line of communications, and the only animal transport that would in such case be necessary is that which would suffice to secure to the army its power of operating beyond rail head, *vis.* :—

100 wagons (six-horse)	supply 4 lbs. per diem to 50,000 men.
100 " "	required to supply a day's forage for the 8,000 cavalry and artillery horses.
16 " "	required to supply forage for the wagon horses.

Total 216

say 220 six-horse wagons, each carrying 2,000 lbs.,
or 1,100 camels, each carrying 400 lbs. and eating 30 lbs. of forage per diem.

Consumption of coal per train and engine mile, taking maxima for each gauge—

		Per train mile.	Per engine mile.
East Coast State Railway . . .	5' 6" gauge.	64'34	54'54
Bombay, Baroda and Central India		59'43	50'61
Nizam's G. S. Railway . . .		59'62	51'07
East Indian Railway . . .		56'89	47'32
		<u>4)241'28</u>	<u>4)203'54</u>
Rajputana-Malwa . . .	Metre gauge.	60'32	50'88
Burma State . . .		34'84	30'74
Southern Mahratta . . .		33'98	28'81
Bengal and N.-W. Railway . . .		33'78	31'18
		<u>29'96</u>	<u>24'96</u>
		<u>4)132'56</u>	<u>4)115'69</u>
		<u>33'14</u>	<u>28'92</u>

The requirements of the whole army of 50,000 men, 8,000 horses, and 1,100 camels per diem are—

	lbs.
50,000 men at 4 lbs. =	2,00,000
8,000 horses at 25 =	2,00,000
1,100 camels at 30 =	33,000
Total	<u>4,33,000</u>

One train 3' 6" or metre gauge carries 60 × 2,240 lbs. = 1,34,400 at 10 miles an hour.

Three trains would carry 4,03,200 lbs. 30 miles in five hours, and

Four trains would carry 5,37,600 lbs. 30 miles in six hours to the terminal station, assuming 10 miles or one hour intervals.

Allow three trains per diem for railway material and one for coal and contingencies.

This brings us to eight trains for one day and seven trains the next, and so on alternately.

If we take the more probable figures for an army of 30,000 men with 5,000 cavalry and artillery horses supplied by a 2' 6" gauge railway, we get the requirements per diem—

30,000 men at 4 lbs.	60	six-horse wagons.
5,000 cavalry and artillery horses	60	" "
Forage for horses of 123 six-horse wagons	10	" "
Total	<u>133</u>	

Say 135 wagons, each carrying 2,000 lbs., or 675 camels, each carrying 400 lbs. and eating 30 lbs. forage per diem.

Well, taking out 15 trains per diem, the number of train miles performed is 450 loaded and 450 empty.

The statistics in Report of working of Indian Railways, 1895-96, show an expenditure of 60'32" lbs. per train mile in the 5'6" gauge and 33'14" lbs. per train mile in the metre gauge. These figures are arrived at by averaging the four maxima returns for each gauge. I think I am safe in taking 80 lbs. of coal per train mile for my expenditure in a rough military railway. (I have left my notes in England and so cannot quote the figures that I worked out for the Soudan Railway.)

This gives us an expenditure of fuel as follows :—

	lbs.
For 450 train miles loaded	36,000
" " " unloaded @ 40 lbs.	18,000
Total	54,000

What would 5,000 camels consume in one day ?

At 30 lbs. per head I make it 150,000 lbs. The railway thus shows a daily saving of 96,000 lbs. of fuel or forage, which are practically the same thing.

You will doubtless remark that I make no allowance for oil, tallow, grease, etc., expended. Neither do I take into account a vast amount of camel-gear, medicines, etc., etc. I make no allowance for sick camels, sore backs and a still more important item, in my experience, dead camels !

An accurate estimate of comparative cost would take some time to work out because we would have to set off the capital cost of the railway against the purchase value of the animals, or the interest on the capital sunk against the price of hiring.

I estimate the poundage per diem—

	lbs.
(1) 30,000 men @ 4 lbs.	1,20,000
(2) 5,000 cavalry and artillery horses @ 25 lbs.	1,25,000
(3) 675 camels @ 30 lbs.	20,250
(4) Ordnance and Hospital Transport mules, etc.	77,000
(5) Siege train and spare animals	18,000
(6) Rations for followers (camel-men, etc.)	25,000
Total requirements of an Indian army per diem	3,85,250
or	172 tons.

The latest pattern of 2' 6" gauge engine will take exclusive of its own weight 100 tons tare up an incline of $\frac{1}{4}$; halve this for our military line, so that four trains would take 200 tons of stores 30 miles in six hours, starting at 10 miles or one hour intervals. This leaves us a margin of 28 tons per diem for passengers, slaughter cattle, and so on. Allow four trains per diem for railway material and one spare for coal and contingencies. This brings us to nine trains per diem.

[I have been desired to add this footnote since reading this paper, to dispel an impression that I expect to work up to the large order of 15 trains a day.]

Also cost of wages of working staff, dilapidations, etc., against the wages of attendants and compensation for loss of animals.

I make no mention of the making and upkeep of the camel road.

This I purposely omit because I take it that a road of some kind is indispensable, even though a railway be made or exist. In some cases, of course, the railway track can be utilized, but this should only be sparingly done, at imperative points, *i.e.*, when there is no other way.

There is another important condition liable to be overlooked. This is that the camel eats whether he is working or not, whereas the engine only eats when it is at work.

The camel's attendant can eat or sell a proportion of the camel's food, whereas the engine's attendant cannot eat coal, he has no appetite for tallow or oil, and the sale for these articles in a hostile country, except possibly the last named, is limited.

Finally, the camel cannot tell you when his attendant is stealing his food and he is consequently underfed.

He, therefore, when in a semi-starved condition, is loaded up and works till he drops.

The engine, if not fed, will not work, and if it gets out of order it is easily doctored.

So much for the value of a field railway. I quote now from Colonel Home—

Classification of railways for war purposes.

"Railways must be viewed in two distinct lights:

1st.—As a means for concentrating armies from distant points and for placing them in the theatre of war.

and.—As a means for supplying those armies while operating on the theatre of war.

This division is really that between railways actually in the zone of military operations and outside it. In the former case the military element predominates: in the latter, the civil.

It is manifest there must be a line of demarcation between these two.

This the Germans term the 'Transfer Station'."

The name is a good one, for it is here that the supplies are arranged and forwarded as required.

Transfer Station. I will not dwell on the first, for I have nothing to say about it beyond remarking that I presume the existing system would not be interfered with.

The second part of the railway system, *viz.*, that in the theatre of war, is the one that claims my attention.

A campaign undertaken by the army of India is likely to be either—

- (1) across the frontier from a base supplied by the existing civil railway system. This base would be the German Transfer Station ; or
- (2) across the sea from a base supplied by ships, or it might be situated on a large river or estuary and supplied by barges or river transport of some kind.

For the purpose of the railway man I propose to define

base as the most advanced point on the line of communications assured against molesta-

tion by the enemy and having uninterrupted communication with the main source of supply for the army in the field either by rail or by water. As an illustration of (1) I take Peshawar, which is the terminus of a standard gauge line or rail head on the existing Quetta-Chaman Railway. Both of these would be (to use the German term) "Transfer Stations." For (2) Alexandretta (Iskenderun) in the bay north-east of Cyprus. Basra or possibly Baghdad, if the river Tigris is navigable so far up.* There is plenty of choice: Peking, Canton, and so on; about which our Intelligence Department would afford all necessary details. The first consideration is for the Commander-in-Chief to determine on his base and then to map out his line of advance.

In civil practice the best route from an Engineer's point

Choice of alignment. of view determines the alignment.

In war practice the Commander-in-Chief determines the line and the Engineer has to do his best to follow. So many considerations, political and strategical, are apt to affect the settlement of the line of operations that the railway facilities must be the last, in many cases, for consideration.

But if the Commander-in-Chief has any choice at all, his decision will naturally fall to the easiest line, for he would follow that whether he had a railway or not. But in making his final selection he might go out of his way to give undue preference to a route which afforded facilities for collecting supplies, water, etc., all of which would be much discounted if he had a line of railway bringing up supplies equally abundant from his base.

So before making his final decision the Commander-in-Chief would take his Chief Engineer into his confidence and

* NOTE.—It is navigable so far. —J. A. F.

the result would probably end in a compromise a good deal in favour of the railway alignment.

The establishment of a military railway system for war purposes is one of the first essentials to modern military enterprise, and evidently with this end in view the Field Service Manual, the Regulations for the supply of an Army in the Field and for the organization of the Lines of Communication (issued with A. O. dated 1st November 1890) and the Rules and Regulations for the working of Railways in War in foreign countries, published by the War Office, all provide for a Director of Railways.

First case across the land frontier.

Taking the first case. At the terminus of an existing line.

I assume that mobilization sidings, platforms, store-houses, camping-grounds, etc., have all been arranged in peace time.

But this is not enough! The railway management should at once lay a small extension to separate the field railway material depôt from that for the troops and military stores proper.

The Director of Railways ought already to know the class of country that lies before him. If not, he must find out, and the result of his first reconnaissance will show him whether he should continue in the existing gauge or adopt a lighter line. If he can go on a few, say 30, miles with the existing gauge, it is an advantage, even if he does so with lighter road.

Here the question of management comes in. It is absolutely essential that the railway civil administration should cease at its own terminus and that a boundary be fixed beyond which the Director of Railways is supreme.

Management beyond zone of civil administration.

The Director of Railways should have his own engines, tenders, material trains, and a small proportion of ordinary stock for the use of his portion of the line, but a system of demurrage must be arranged to provide for the through traffic of stores from the base of supplies. In case it be decided to carry the broad gauge only a short distance, the above might be arranged entirely on the demurrage system or hire system, any requisite personnel for working within the defended zone being lent to the Military Authorities. By defended zone I do not mean to imply that civilians are reluctant to go beyond it and be under fire, but I do lay great stress on the necessity of everybody in the presence of an enemy with an army in the field being under military discipline, and so if it becomes

necessary to employ civilians beyond the defended zone with an army, in positions of responsibility such as those on a railway, I prefer that they be specially enlisted men—soldiers in fact for the time being, to be discharged or not according to their individual wishes and the exigencies of the service at the close of the campaign.

To pursue the subject of extending the existing railway system, a railway depôt would be formed Field railway depôt or advance depôt. for the storage of numerous odds and ends of tools and special materials, signalling apparatus, and so on, that have to be pushed on from time to time as the line progresses; but there would be no depôt required for permanent-way material in bulk; the depôt for these would be wherever the rails and sleepers are procurable—Kurrachee, Bombay or Calcutta, perhaps Lahore, as the case may be. The material trains would be made up in fractions of a mile complete, properly marshalled, ready to be shunted to the advance depôt where the military engine would be hitched on and the complete train run out to rail head with any special supplies such as water, points and crossings, food and forage, and so on. It must be remembered that the Engineer in charge at rail head is never anxious to put in sidings, as they cause considerable delay, so it must be arranged that the engine shall get behind its train at the last siding so as to be able to push it up to rail head. The most convenient form of siding for this purpose is naturally one with points facing home, as the material train can be roped in ahead of the points and so save delay. Of course if you indulge in the luxury of loop-sidings, so much the better.

I will not dip into the technicality of the business, as this is a question of detail appertaining solely to Engineers.

Suffice to say that I conclude the Director of Railways The railway advance depôt camp. has been allotted a separate camping-ground near the railway depôt with an adequate guard of soldiers to protect it from marauders, and has made his own arrangements for the protection of his stores by store-keepers, chowkidars, and storemen.

In this camp he will have collected such labour as can be procured and all the camel, mule or bullock-cart transport, according to circumstances, sufficient for the needs of the workmen preparing the formation. This camp is merely the nucleus of the workmen he will require for his work and would, as a rule, only accommodate the gangs of labour-contractors of repute who would be responsible for the good behaviour of their gangs.

Meanwhile the Engineering staff under protection of the troops would have made a reconnaissance as far ahead as the cavalry scouts and should have picketed out the centre line of the railway. The home gangs would be put on at once to prepare the surface, and as soon as they have got a mile ready, plate-laying would commence.

As the line advances and inhabited districts are passed through, the able-bodied men of village after village would be swept into the service. This serves a twofold purpose, *viz.*, occupying the idle population and so diverting their mind from ideas of plunder and resistance to the intruder. Of course these men would not sleep in camp, but they would be mustered morning and evening and return their tools every evening to the depôt in the advanced camp.

The amount of formation required depends of course altogether on the configuration and nature of the country, climate, rainfall, etc.; but I may here remark that, whatever be the conditions, it is very advisable that the line be as straight as possible, as this facilitates its protection and reduces the work of patrolling.

Where permanent rivers are met with, they must be bridged, but where, as is often the case on our frontiers, the water-courses are dry for several months in the year, and raging torrents at times, it is better to go straight over them on inclines leaving an alignment for the bridging party to tackle when they come up. It is astounding what inclines a good engine-driver can run down and up, provided you give him a good firm road bed and a straight line. True, the line may be washed away and some inconvenience result, but the delay will not be so great as if you had waited to bridge.

The line must then go straight ahead as fast as it can be prepared and the rails laid; inclines that would make a Railway Manager's hair stand on end may be surmounted up to 3 and even 4 per cent.: these can all be corrected later on if necessary. Finally, no doubt, an acclivity will obstruct the way. There the Engineer will have scope for his best ability. He should endeavour to attack it in such way that he leaves an alternative easy route by some detour for the parties coming behind him, but if the ascent is short, he must go up it as best he can on a bit of straight and put a hoisting engine at the top. If the hoisting engine has not yet arrived, he must haul an engine up with crab winches to work the upper line, and the trucks as they arrive

must be hauled up one by one or two by two according to power.

A siding should be provided at the top to imprison the trucks as they arrive and a catch siding like the one at Kalka at the bottom.

I dare say some will think I am propounding a startling theory, but not so. An actual case can be quoted of a 38-ton gun being hauled up an incline of 21·5 per cent., about 800 feet long, by locomotives working along the level, and down a slight incline at the end of a wire rope. I have not the details of the operation at hand, but doubtless they could be obtained, if necessary, from the C. R. E. of the Plymouth Defences. Many other expedients for getting over steep slopes would readily present themselves to a practical man in an emergency.

The construction parties should be supplied in the most liberal way with all necessary appliances.

Construction.

There would probably not be transport available to admit of the line being pushed on otherwise than by telescopic laying, so there must be no stinting of trollies, crow-bars, levers, etc. Damaged trollies, tools, etc., must be thrown on one side, as also any spare rails, sleepers, and small stores not used up in the day's work. These can all be recovered and sorted at leisure by the topping-up gangs in pick up trains weekly when the advance party is shifting camp: generally Sundays or Fridays, according to the predominant religious tendencies of the workmen. For quick work I am in favour of wooden sleepers uncreasoted "adzed to cant" and flat-footed rails spiked direct to the sleepers without bearing-plates: the fish-plates need only be half bolted, *i.e.*, in the contiguous end holes of the rails. If you are bound to use ordinary market stock, the rails should be assorted for curves so that the joints may catch one another up by the insertion of a short rail inside or a long rail outside as the case may be. But if specially made rails, as suggested by Mr. Bell, be kept in store, this precaution is unnecessary and time will be saved. The topping-up gangs coming up behind can finish the sidings, complete the packing up and attend to super-elevation, pack up properly, and such like niceties.

It is needless to go at length into ballasting; that depends so much on the surroundings. Of course

Ballasting.

if you are crossing the sandy desert, your ballast is always at hand: if not, you often find detritus at the foot of small rocky hills that only requires a little breaking to be good enough. In a grass country you must be content with

earth packing, and if the climate be a very wet one, there is nothing for it, you must quarry and have several steam stone-breakers at work, and don't spare your dynamite. But it must be remembered that the line is for a campaign, and banks and ballasting that would go to dust on a trunk line in a few months will probably serve your purpose. If you have to burn your ballast, I suppose it must be done, but sometimes the ruins of villages, etc., may come in handy.

The General Officer Commanding could determine where the stations are to be, but to begin with, 10 miles intervals are about convenient. The points and crossings would merely be dropped into place by the leading plate-layers, and the sidings put in by a special gang following the advance party.

Bridging is, I think, best done by stock girders of given spans. There is no time to calculate works of art. Nothing should be undertaken that cannot be done in time. It is poor consolation to think that an elaborate bridge has been completed in time for the troops to return by it.

If the country is occupied at the close of the campaign, it is another matter. Then the skilled civil Engineer replaces the military man and the line becomes a trunk line; we have nothing to say to that.

Broad and rapid rivers which usually have high banks must be crossed on suspension bridges. If resources do not suffice for making a bridge that will carry the train complete, an engine must be passed over by hand or by some contrivance, such as a raft or boat to work the section beyond the river. The trucks can be passed over in pairs either by hand or by rope haulage, it being borne in mind that the strain on the bridge is less violent if a second truck comes on to the bridge shortly after the first has passed the centre. The last vehicle over being the brake-van must be handled with special precautions.

So much for permanent-way. I have given more detail than I intended, but I have left out all that can be found in text books, as far as I know. But before I leave the subject I wish to lay particular stress on Mr. Bell's proposal to have special stock prepared in advance. Cutting rails is a most tedious and annoying operation and a great deal of the reluctance to putting in sidings is due to the trouble involved in cutting rails.

If water can be found in the country, its utilization calls for

no special skill: if it cannot, then water must be sent from the nearest available abundant supply, as a ration along the line either in special tank wagons like those supplied for the Suakim-Berber Railway, or in tanks carried on low-sided trucks.

A 1,200-gallon tank is a convenient size for metre gauge stock. We had 1,500-gallon tanks on the Soudan Railway, but found them too heavy when full; so as to ensure their never being filled beyond 1,200 gallons we had to knock out a rivet to act as a tell-tale.

Such a tank is easily handled, and two or three of them mounted on cribs of sleepers answer for water cranes. A 5-inch flange pipe, bolted into the tank near the bottom with a two ply canvas hose that could be hitched up when not wanted, served our purpose without any stop cock or valve arrangement. Of course at head-quarters you would have a water crane, one or two steam pumps and so on *à discretion*.

There are any number of pumps in the market suitable

Pumps.

for railway work. I may mention Pulso-meters, efficient up to about 80 feet, and Merryweathers, up to about 90 or 100 according to size and cost. For hand pumps, many of which I have tested, I have no hesitation in advocating the small ships fire engine double acting pump which lifts and throws 60 feet with ease and can be carried about anywhere. These are an article of store in England.

Rolling-stock.—Any that can be got in practice; in theory

Rolling-stock.

all of the same pattern, so that part of one can be used to prolong the life of another, and let there be plenty of duplicate parts, spare wheels, brasses, etc., buffers, draw bars, etc. There is no time to do extensive repairs, reset springs, etc., etc.

Machinery shop.—If you are working at the end of an

Machinery.

existing railway, there is not much point in having extensive plant as you can send things back, but if you are working a separate line, it is false economy not to have a liberal supply of machinery driven by steam, *i.e.*, lathes, shaping machines, drilling machines, etc., etc., all of which would be specified by the Engineer.

A large smith's shop is required of course, and attached

Smith's shops.

to it it is convenient to have a brass furnace driven from the same blast as the forges.

Some of the machinery will eventually find its way along the line to the advanced running shed, so that it is well to have more than one engine at hand and sets of shafting.

There should be a liberal supply of shedding for the shops and engines. A good deal of this can of

Shedding. course be improvised except in desert countries, and tarpaulin shelters will do for a while, but a few thousand superficial feet of match boarding, some scantlings and corrugated iron neither cost nor weigh much and will prove economical in the end.

Tents will do at first for stations, but as time wears on, the Station Masters should be supplied with Temporary stations. offices and stores, and Locomotive Foremen should have lock-up places for their spare parts, oil, and other stores. All these arrangements will take place as the Traffic Department gradually takes over the line for traffic from the construction staff.

Important stations will be opened at places chosen by the General Officer Commanding, and then extra Permanent stations. sidings will be put in for the various depôts of the Army Departments.

The troops at the base will now probably be employed on the open line. Many men will make Employment of troops at the base. themselves useful in maintenance gangs, as clerks, porters—even guards, shunters, etc., etc.—and so free the skilled men to go on ahead. They will also furnish the train guards if the line of communications is liable to be disturbed.

The line has hitherto probably been worked in a hand-to-mouth way, all but the material trains have Initial stage of railway. started at odd times, been kept waiting perhaps hours. Officers and men on leave, tourists perhaps, have elbowed their way into the trains and run out on the material trains, when not stopped, to rail head just to see how they are getting on. But when about 30 Traffic Manager. miles is open the Traffic Manager, who all Introduction of system. this time has been selecting his Station Masters and staff generally, steps in, prepares a time-table and gets it published in orders. The Railway Staff Officer assumes his sway and nobody is allowed on the train without a pass signed by him. The Heads of Departments begin to realize that transport must be demanded just as in a civilized railway and the practice of seizing a truck, loading it and wheeling it up surreptitiously by hand and hooking it on to the guard's van

results in that truck being ruthlessly left behind. Of course the Traffic Manager comes in for a good deal of recrimination: the Engineers get their usual amount of good-natured chaff, but in about three days everything settles down and the army possesses a railway of its own; imperfect I admit, very, but still a railway and useful.

The base station yard should be liberal as regards sidings; there I advocate a departure from ordinary railway practice of grouping the sidings. It detracts from the convenience of the railway management I admit, but it destroys the convenience of the troops for whose benefit the railway exists. So I think there should be a siding for each group of camps and an Ordnance and Commissariat siding.

The troops load up the trucks and Officers Commanding or Heads of Departments furnish bills of lading. The receipt of the bill of lading by the Station Master is a warrant for him to send the shunting engine to fetch the truck to the marshalling sidings. If possible, this should be away from the other sidings, somewhere near the triangle or turn-table if you have such a luxury: if it be possible to pass such truck over a weigh bridge, so much the better, as Tommy's ideas of loading are apt to be liberal; but failing this luxury, a measurement of the springs gives a fair indication of what a truck ought to hold.

The trucks would usually be low-sided, half-sided, and high-sided. Covered goods wagons, as a rule, cannot be spared, as they are nursed for special stores and are in most cases provided with slings for stretchers to supplement the first class carriages and hospital ambulance carriages after a fight. I don't think tickets for passengers are necessary. The Railway Staff Officer gives the marching out states of troops for departure, also their authorized baggage, horses, etc., and enumerates the single passes he has given. The baggage states check with the way bills of the Officer Commanding troops and the departmental way bills give the contents of the remainder of the train. So all the Traffic Manager has to do is to accept each truck as fully loaded. The returns say No. 1 train as so many trucks at x tons and so many individuals.

This of course is not indispensable, but it is desirable in making up the Manager's report monthly or at the end of the campaign. He must show in his report so many ton miles, or else nobody will believe that the railway has done anything.

The Rules and Regulations for the working of railways in war in foreign countries, published by the War Office, and Regulations for the supply of an army in the field (abroad) and for the organization of the Lines of Communications give sufficient instructions without my endeavouring to add to them.

Locomotive Department.—I am in favour of each engine-driver having his own engine and being responsible for it. The days on and off must depend on circumstances, but the scale of engines should be liberal, or else there will be a break down. The 21 per cent. laid down by Molesworth for railways in India is not, I think, excessive. Every engine-driver on taking over his engine at the running shed should be bound to examine it and to report all correct to the Foreman before going out to join his train a quarter of an hour before time, and on coming off duty he should hand in his card with all details filled in and repairs wanted endorsed. It would be tedious if I were to explain the whole system of running-shed practice; that can all be found in books, or any man of experience can elaborate a system of his own. Every engine should have a diary of its own and at the close of every month the Locomotive Superintendent abstracts the incidents in the life of each engine, such as repairs, large and small, days at work, miles run, washed out, tested, etc., etc.

Of course some people are fond of elaborate details and go in for tons hauled, speed, consumption of coal, tallow, oil, and so on. I don't think this is at all necessary for a military railway for purposes of report, but the Locomotive Foremen should be made to keep the details of consumption per train mile, so that an average can be struck and estimates of requirements be made out months ahead. Of course any Locomotive Superintendent would know all this as regards civil practice, but he would find his ideas a good deal upset in a military railway, and so I think we want men who can approach this part of their work from a field service point of view and not bother their subordinates about details which are essential in a commercial line but vexatious in a military one.

There are so many things that upset one's calculations on field service. Your whole supply of oil and tallow at an out-station may be raided in a night, perhaps an engine-driver or two cut up and a whole train burnt, and if you have made your estimate too fine, where will you be? I remember once finding an extraordinary expenditure of lubricating oil going on. We used the cheapest

Anecdote.

local oil, olive oil, in some of our stock. The boxes were tested from time to time and the waste was found to occur when they were idle as well as when running. The boxes did not leak and defective ones were put straight. At last one night one of our savage allies was detected eating his evening meal under the shelter of a truck. Anon he inserted a straw into the vent of the nearest axle-box and took a pull. The murder was out! The admixture of a little kerosine in the lubricating oil saved us from further loss.

In signalling by telegraph, except in very extended operations, the railway line and correspondence line will be the same. The system, line clear, crossing stations being from 10 to 15 miles apart : 15 is quite close enough when the line is in working order. I dare say many will object to the two services being mixed up, but in practice the strain put on the line by the railway is very slight. It must never be forgotten that the traffic on a military line is trivial as compared with a commercial line, even with an army drawing its supplies from the base.

Defence.—I am afraid I cannot go deeply into this part of the question as it would involve me in a voluminous pamphlet. Roughly speaking, the railway supplies its own defence. Its efficiency varies directly in proportion to the number of trains run. But, as a rule, running by night is neither desirable nor necessary, and it is then that the mischief is done. The General Officer Commanding will readily fix on strategical centres from which the line can be viewed and patrolled if necessary. I am not in favour of a line of pickets quartered along the railway in martello towers. I have seen this tried, but with doubtful success. The pickets are never large enough to take the initiative, and use up a large number of troops. What I prefer is good strong pickets about 20 miles apart on commanding points having a good view of the line. These should be composed preferably of mounted infantry; but failing this useful arm, of a small permanent garrison of infantry to hold the fort and a flying body of cavalry to scout on the line and in surrounding country and swoop down on any suspicious gatherings in the neighbourhood. Patrolling should not be confined to the line, but must extend along all the well known routes, right and left. The parties would afford great assistance to the Intelligence Department, and would in some cases have spies attached to them. An engine-driver can generally detect any mischief on the line ahead, and if he comes on a

break or destruction, his alarm whistle will be heard a great distance off. It may be accepted that with any but a very skilful enemy the telegraph line will be destroyed at the same time as the line of railway, and the break will naturally be communicated to the guard of the train, who has in such cases to take special precautions.

But every brake-van should carry one or more velocipede trollies which can be worked by men of the train guard ahead of the engine, so that they can discover faults in the line before the engine plumps into the snare. These velocipede trollies are useful for many purposes. In case a train breaks down between two crossing stations, a velocipede worked by even one man can reach the next station and signal to the head office for help. Of course if the enemy has not been cleared out of the country, several velocipedes manned by picked infantry would be sent together and could at worst communicate by flag signal with one of the patrols or patrol stations. The velocipedes I have seen were of two patterns, *viz.*, to carry four or two men. A single man can work the smaller pattern on anything up to $\frac{1}{10}$ and can push it up a $\frac{1}{30}$ incline at a pinch. They are also very useful for telegraph linemen, as they are provided with trays to carry a roll of wire and small stores; in fact I believe they were originally designed for this purpose. Since writing this I see that the Sheffield Velocipede Trolley Co., U. S. A., have brought out trollies worked by small gasoline engines. If the country is very disturbed, the trains will have to be run in groups at time intervals. The leading train preceded as before by trollies and carrying a strong escort of infantry or mounted infantry according to the circumstances of the case and if the accommodation admits of it. Of course horse ramps would be carried for detraining rapidly.

The great secret of keeping communication open is to have regular and constant traffic. The people to be feared are small gangs of determined men who place a rock here, and lift a rail there, and so on, and wait near the obstruction to pot the engine-driver. Large gatherings for systematic destruction of a line take some organization and can usually be detected by active scouts and well paid spies.

Mr. Bell, in his note which I read at the beginning of this paper, alludes to the Dervishes capsizing and rolling up the Soudan Railway in 1885. Of course they did not roll it up endways as he suggests, but they did capsize a portion, and with the weight thus at their

Secret of keeping
open communication.

Destruction of Soudan
Railway in 1885.

advantage, rolled up the remainder on the bias. To execute this practical joke it took them from the middle of October till the 1st of December to organize their party of 800 spearmen and 300 riflemen, of whom some 150 or so were mounted on camels.

At that time the field force available between Wady Halfa and Akasheh, 85 miles, was 400 men, the rest of the force being locked up in station and garrison duty. The Dervishes succeeded in destroying 2 miles 84 yards of permanent-way, damaging a few camp kettles and one head lamp with comparative impunity, and returned to their head-quarters elated with their success. The General subsequently possessed himself of the report on the operation, which described the railway as so damaged that a year's work would be required for its restoration.

We commenced repairs with sappers and infantry on the morning of 7th December, and restored through communication at 4 P.M. on the 10th. Half the working party had to come 64 miles by rail, $\frac{1}{3}$ were on the spot and the remainder came twenty miles by rail.

So much for the year's work!

All the same I would remark that nothing except force of arms can prevent a strong body of men from turning over any line of railway if left to their own devices. The plant in this case was metre gauge plant, rails $40\frac{1}{2}$ lbs. to the yard, on wooden sleepers 6 feet long; the actual gauge is 3' 6". I am confident the same destruction could have been achieved with anything up to 60-lb. rails on the 5' 6" gauge. It is a mere question of enough men scraping away the packing and lifting all together.

So you may expect your line to be turned over at any moment, but its restoration, you see, even with partly unskilled labour, is not very difficult. We had only 40 sapper plate-layers, all told, the rest of the working party being infantry. I would add that they belonged to the Berkshire and Princess of Wales's Own Yorkshire Regiment (19th), and a large proportion being men evidently accustomed to hard work, they dropped into gangs of their own accord and a very handy lot I found them. Those who had been plate-laying in civil life dropped instinctively in amongst the sappers. I hardly went near the men making up the banks, as they did the work under their own officers and non-commissioned officers.

The defence of railway stations is an art in itself and as a type we may take the form of unclimbable enclosures defended at opposite angles by

towers so that a few men may flank a long line of wall. Sometimes the railway and commissariat stores will form the enclosure on one side or other and be protected by a ditch, wire entanglement, and so on. But the circumstances of each case will readily determine the type of defence to be adopted ; for instance in many cases, with a good open site, an enclosure may be dispensed with, its place being taken by a hail of bullets from a machine gun or half a dozen men armed with the modern rifle.

As a rule, however, railway destroyers don't go for stations unless they want something particular, such as ammunition or treasure, in which case they run their heads against a strong escort and probably get worsted in the encounter.

I must now pass rapidly to the case of a railway for an army
 Railway beyond the seas. operating beyond the seas.

The first thing for the Director of Railways to undertake is
 Piers and landing stages. the erection of piers at the base. The design of these will depend on the nature of the anchorage, conformation of the shore, exposure or otherwise to gales, surf, or no surf. To make a pier for ships to run alongside is rarely possible even with deep water close in shore in an absolutely quiet anchorage ; moreover, unless your pier be very big, it is impossible to unload more than one ship at a time. It is open to argument which is the better from a shipper's point of view, unloading at a pier or unloading at both sides into barges. I think they prefer the latter.

We may therefore accept it as an established fact that
 Method of discharging ships. piers would be made for unloading barges, one on each side.

The Regulations for Royal Engineer services indicate that
 Materials for piers and landing stages. a certain amount of stuff would be shipped to the base for making piers and landing stages. Here I pause to remark that in shipping from England or elsewhere some officer accustomed to such work should supervise the loading of the ships. In the land. first, I would put a small amount of railway material with all but a mile or so of rails at the bottom, sleepers in the middle, travelling cranes, one engine, one mile of roadway and the pier stuff at the top.

As soon as the pier is ready, a double line of rails should be laid along it and the travelling cranes landed at once and erected. This will give you a fair start with the tools that belong to the field equipment and you will be able to carry on

till the second and third and succeeding ships arrive with the heavier gear.

Engines are generally shipped in pieces that can be handled
 Landing engines. by the tackle on the vessel.

In getting them off the barges there is nothing to equal a pair of shears made up of navy spars. In erecting this the navy and garrison gunners can lend a hand.

If there is no tide, as in the Mediterranean, you can often run heavy loads, like engines and tenders, straight ashore on rails. But if you have to bring them up an elevated coast, I have found an incline of two rails on crib piers with a sledge made of rails and sleepers, upside down, running on it, an easy and expeditious method of landing stores.

Whatever it is, engine frame, under frame of truck, sets of wheels, boiler and fire-box, etc., it is hoisted on to the sledge and run up the incline by tackle rove on crab winches.

If there is time to put in a turn-table at the shore end of the pier, do so, but as a rule it will be found less troublesome to put in a triangle. You want a row of sidings for erecting your rolling-stock.

The cases in which the parts of engines, etc., are shipped should be carefully preserved. Of course the erectors will try to break them up for firewood. This should not be permitted, as these large cases can be knocked together into sheds and cupboards for storing and cleaning up the motion of the engines. Such protection is absolutely essential if you want to get your engines together quickly.

While we are on the subject of landing and erecting engines and rolling-stock, I may as well mention a few points about mechanical appliances.

There are no regular stores laid down for railway work in the field, the result being that at the outbreak of a campaign somebody at headquarters takes a list and jots down anything that he thinks will come in handy. I have found such articles as patent rail lifters, triangle gins, crab capstans, patent spike extractors, blocks of sizes, hydraulic and many other jacks, odds and ends that are quite useless.

Crab winches should always be double geared and have a strap brake as well as pawls, and never weigh less than 8 cwt.

Hydraulic jacks are not suitable for rough work. I know they are an article of store for the artillery and are very efficient for raising heavy

Tools and mechanical appliances.

Winches.

Jacks.

weights: but the heavy weights used by the artillery are made to stand jars, whereas a jar to the framing, etc., of an engine may prove fatal. Hydraulic jacks, unless constantly under examination, have an unpleasant knack of bursting their leathers, especially in hot climates, and so I prefer the screw jack.

Again, there are several patterns of screw jack. The pattern I recommend, whether it be standing or traversing, is the one with C. I. pillar. I have expended plenty of jacks of the 4-pillar pattern; they all go in the gun metal sockets.

Blocks under 15" are as a rule useless. Light tackles are not much use, and if wanted can be borrowed from the Navy or Royal Artillery.

A liberal supply of snatch blocks is advisable.

Cordage should for hot climates be white. We found that tarred rope rotted in the Soudan and became dangerously uncertain. Ordinary white hemp rope was not so bad, but Italian hemp gave us the best results. There should be a large supply of $1\frac{1}{2}$ and 1 inch lashings Hambro' line and twine. Spun yarn rots very quickly in hot climates.

Crow and pinching bars should be steel throughout. The ordinary store axe for breaking up firewood is a fraud! Our men preferred a sledge hammer forged to a chisel point at one side.

Cold sets, swages, etc., etc., should be an article of store issued in dozens. Files, steel, for lathe tools, all should come out in special supplies; this saves robbing smith's boxes of the files they contain and breaking up chisels, etc., to make lathe tools.

I have seen and used various patterns of patent lathe tools with movable bits, but I never met the professional turner who preferred these to steel bars shaped by himself and tempered by the smith.

All kinds of steel don't answer the same purpose, so there should be an assortment which any leading smithy hand could specify in ten minutes.

The service forges and anvils are toys: a forge under 2 feet square is not much use except for very light work. The same remark applies to vices.

Jumpers should not be provided with a bulb in the middle; the extra weight can be made up by extra length. (Railway tools don't require, as a rule, to be carried on pack animals.) I have never seen patent

rail lifters, long levers, spike extractors, and such things used in light work except by beginners. I dare say they are valuable for heavy work in peace time.

I have a good deal to say about explosives, fuzes, and so forth, but I spare you further details of this nature which are rather too technical for a paper of this sort, but I mention a few to show how necessary it is to have these items thought out beforehand.

Finally you should have a good practical Engineer officer in charge of your tools and plant with a good system of accounting, receipt, issue, etc. He should have a separate workshop in which he can keep his tools, etc., in repair.

As the casualties amongst the tools and plant are enormous, periodical boards should be assembled to strike off losses and deficiencies. If these be put off till the close of the campaign, the result will be disaster to the Director of Railways; I have a very shrewd recollection of having to account for every barrel of powder expended on the Ali Musjid road, and I have paid up out of my own pocket for rounds unreported as expended after a fight. I mention this because many officers imagine that "On Service" the same check on expenditure of Government stores as is imposed in peace is not necessary or expected. Read Colonel Furse on the subject and if you are fond of quoting Napoleon's wars, see what Gouvion de St. Cyr has to say about the departments of the French army, or for the matter of that what Napoleon himself has to say about them.

We now come to the important question of gauge for military railway stock. I have no hesitation in fixing on the 2' 6" gauge.

I may say I was long opposed to this gauge, having a preference for the metre, which has held the market so long. Now, however, that the 2' 6" has come so much into use I withdraw my objection.

Reason for choosing 2' 6". My reasons for choosing it are—

- (1) It is sufficiently narrow for mountain purposes—minimum curve 75 feet radius.
- (2) It is not too narrow to admit of roomy rolling-stock. The wagon floors can be made 6 feet wide, inside dimensions, so that cattle trucks can be designed for carrying ponies. This I look upon as a *sine quâ non* for defensive purposes, as explained under defence, and we can carry artillery carriages and wagons without dismantling.

- (3) The stock is procurable in the market and many good designs of engines, etc., already exist.
- (4) We already have 50 miles of this gauge stored in Woolwich Arsenal with a proportion of rolling-stock, and there is every advantage in our adopting the same gauge as in England for military purposes.
- (5) The stock has been in use for many years now on the small powder line at Chatham, on which the R. E. engine-drivers get part of their training. And as this short line has bad curves and steep gradients, it is used for carrying troops and military stores of all descriptions ; it more nearly approaches war conditions than any other line that I know. Hence experience on it is valuable.

The roadway I recommend is that on the accompanying table marked A. Its cost is, say, £600 per mile and it weighs 107½ tons per mile with wooden sleepers.

TABLE A.

*Estimate of Plant required for one mile of single Line of Railway,
2' 6" gauge.*

Article.	Quantity.	Weight.			Measure- ment.	Price variable with market rates.	
		Tons.	Cwts.	lbs.		Rate.	£ s. d.
36-lb. rails, yards, assorted lengths.	3,520	56	11	48	About 4,200 c. ft.	£5½ per ton .	304 0 0
Fish-plates, pairs .	503	1	10	0		£7 „ „ .	10 10 0
Bolts and nuts, No. .	2,012	0	5	0		£12 „ „ .	3 0 0
Spikes, ½ lb. .	9,054	2	0	47		£10½ „ „ .	21 3 0
Sleepers, 6' x 9" x 4"	2,200	47	0	0		2s. each .	220 0 0
		107	6	95			558 13 0

* A maximum ! 2,000 per mile, 4' 6" long, would suffice on a good surface.

Engine and rolling-stock.

Of engines there are several good designs, and these no doubt will improve yearly.

I recommend rolling-stock built entirely of steel for two reasons : one as a protection from fire, the other that with the addition of light plating it can be made bullet proof. The engine cabs should be provided with folding or sliding steel shutters to protect the engine-driver and fireman.

In the Soudan we had to put on rope mantlets ; these were heavy and awkward to sling. Two of our engines had very deep cabs. One of these was well plastered with bullet marks, but we never had an engine-driver hit, I am glad to say.

I discussed this point a good deal with Mr. Bell and would like to have adopted the two feet gauge with its minimum curve of 48 feet radius, but this gauge cannot carry mounted infantry and so I unhesitatingly reject it.

Two-foot gauge. Why rejected.

I know I am at variance in this with many transport authorities who advocate small field railways down even to that with a single rail.

Disagreement with ideas of transport authorities.

I have had a great deal of experience with the 18-inch gauge. As a workshop line on level ground I have nothing to say against it. It does doubtless very well at Woolwich Arsenal and in Chatham Dockyard, but out in the open across rough country it is little better than a toy, unless most carefully laid on heavy rails.

The 18-inch gauge.

There used to be such a line between Borstal Convict Prison and the Medway Forts for carrying the convicts and stores to the works. It may still be in existence. As far as I know, it was a success for its very limited application, but it was carefully laid on 36-lb. rails, if I recollect aright.

Illustration from existing lines.

In contrast with this is the trench railway laid under field service conditions on the Chatham field works ground. It is useful for carrying stores to the batteries, but the speed is dead slow and derailments constant. Of course the curves and gradients on this line are bad, but no worse than we ought to expect in war. I have never tried the single rail line ; its defence would, I think, be difficult.

I have noticed in some diagrams of lines of communication the introduction of breaks in the field tramway lines, with sections of cart or camel road in between. I need hardly say

Organization of train lines on lines of communications.

that this arrangement is practically impossible in a large campaign, as transport animals would not be forthcoming to convey heavy railway material over the gap.

If water carriage intervene, it is a different thing.*

The foregoing is a mere sketch of what we may expect to be called on to do on the outbreak of serious war. To carry this out efficiently and speedily, previous preparation in time of peace is absolutely essential.

Doubtless the railway administration could collect enough labour, skilled and unskilled, from different lines, which, together with such sappers and pioneers as could be spared from other works, would make some kind of show, after a few weeks. But this is not good enough! A lot of men, however skilled, hastily thrown together under officers strange to them require a lot of organization before they can be brought into working order. What we want is a body of officers and men thoroughly skilled and practised in pioneer railway work; the officers must know the men and their capabilities intimately and the men must be prepared to go anywhere at any time. Above all, they must be familiar with the materials they are expected to work with in the stress of war, and these materials must be ready before the emergency arises. I quote from Colonel Furse: "To reap all the advantages of a field railway it is obvious the plant must be kept in store ready to be shipped to the base without delay, *i.e.*, that materials and men must be ready." I say we must have an organized body! Such a body cannot be got except by military administration, and I say it with deference, but none the less with conviction, that a railway corps is one of the first necessities to the Indian Army for large operations.

It is immaterial whether the Director of Railways belongs to the regular army or not. He may be a Volunteer; at any rate he must be subject to Military Law for the time being. But all below him must be soldiers, ready by the terms of their enlistment to face any danger and able to defend themselves efficiently. We have already too many defenceless followers in the field; we want no more. I may add that it requires something more than mere skill and ordinary courage to drive an engine with bullets pattering about.

Such a corps could be enlisted in India and employed in some railway works of general utility in the peaceable portions

* NOTE.—Major Ferrier here gave a practical illustration on a sketch map.

of the country, so that their removal in time of war would cause no dislocation in the railway administration.

It is not my intention to sketch out an organization of this nature, as it trenches on a subject under the consideration of higher authority, on which I would not presume to hazard an opinion.

But I am quite within my province in directing the attention of my brother officers to General Sherman's operations in Georgia, where an army was supplied for six-and-a-half months over a line 473 miles long. The corps of workmen was 10,000 strong and on one occasion replaced 35,000 sleepers and 9 miles of rails in seven days. The true defence of the line was effected by the Engineers always having men and material ready. In spite of the large and skilled railway population on which the army could call and of the fact that practically the nation was in arms, it was found extremely difficult to keep this Railway Construction Corps together till they were placed under a severe military discipline. I need not enlarge on the inconvenience likely to arise from the repetition of the thirteen days' strike mentioned by Mr. Bell.

I will not use the time-worn quotation of what is done in Germany; suffice to say that after much debate and some hesitation we have organized a small but highly efficient Railway Corps in England with a reserve capable of rapid mobilization and embarkation.

The Egyptian Army has its Railway Battalions. Even the army of the Congo has its Railway Regiment.

Is the Indian Army, the most practical army of the times, to be the only one without a Military Railway Corps?

Major Ferrier, in conclusion, invited discussion on the paper he had read, pointing out how much the lecture would gain in interest if subjected to careful criticism.

Colonel Bisset, R.E., after a short interval, rose and said he had waited for those criticisms which Major Ferrier had invited, to bring out any weak points in his arguments, and to give him the opportunity of answering any questions which might be asked. In the absence of any such criticisms or inquiries he ventured to offer the following remarks, which, though not perhaps criticisms, would be taken as his personal opinions upon some of the more important points discussed in the very interesting lecture which they had just heard from Major Ferrier:—

In the first place, said the speaker, I would like to support with all the strength which can be put into words the quotation from Colonel Furse, which lays down as an axiom that for a railway to be of use for military purposes the "materials and men must be ready."

break or destruction, his alarm whistle will be heard a great distance off. It may be accepted that with any but a very skilful enemy the telegraph line will be destroyed at the same time as the line of railway, and the break will naturally be communicated to the guard of the train, who has in such cases to take special precautions.

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So you may expect your line to be turned over at any moment, but its restoration, you see, even with partly unskilled labour, is not very difficult. We had only 40 sapper plate-layers, all told, the rest of the working party being infantry. I would add that they belonged to the Berkshire and Princess of Wales's Own Yorkshire Regiment (19th), and a large proportion being men evidently accustomed to hard work, they dropped into gangs of their own accord and a very handy lot I found them. Those who had been plate-laying in civil life dropped instinctively in amongst the sappers. I hardly went near the men making up the banks, as they did the work under their own officers and non-commissioned officers.

The defence of railway stations is an art in itself and as a type we may take the form of unclimbable enclosures defended at opposite angles by

towers so that a few men may flank a long line of wall. Sometimes the railway and commissariat stores will form the enclosure on one side or other and be protected by a ditch, wire entanglement, and so on. But the circumstances of each case will readily determine the type of defence to be adopted; for instance in many cases, with a good open site, an enclosure may be dispensed with, its place being taken by a hail of bullets from a machine gun or half a dozen men armed with the modern rifle.

As a rule, however, railway destroyers don't go for stations unless they want something particular, such as ammunition or treasure, in which case they run their heads against a strong escort and probably get worsted in the encounter.

I must now pass rapidly to the case of a railway for an army

Railway beyond the seas. operating beyond the seas.

The first thing for the Director of Railways to undertake is the erection of piers at the base. The design of these will depend on the nature of the anchorage, conformation of the shore, exposure or otherwise to gales, surf, or no surf. To make a pier for ships to run alongside is rarely possible even with deep water close in shore in an absolutely quiet anchorage; moreover, unless your pier be very big, it is impossible to unload more than one ship at a time. It is open to argument which is the better from a shipper's point of view, unloading at a pier or unloading at both sides into barges. I think they prefer the latter.

We may therefore accept it as an established fact that piers would be made for unloading barges, one on each side.

Method of discharging ships.

The Regulations for Royal Engineer services indicate that a certain amount of stuff would be shipped to the base for making piers and landing stages. Here I pause to remark that in shipping from England or elsewhere some officer accustomed to such work should supervise the loading of the ships. In the first, I would put a small amount of railway material with all but a mile or so of rails at the bottom, sleepers in the middle, travelling cranes, one engine, one mile of roadway and the pier stuff at the top.

Materials for piers and landing stages.

Shipping from England.

As soon as the pier is ready, a double line of rails should be laid along it and the travelling cranes landed at once and erected. This will give you a fair start with the tools that belong to the field equipment and you will be able to carry on

till the second and third and succeeding ships arrive with the heavier gear.

Engines are generally shipped in pieces that can be handled
 Landing engines. by the tackle on the vessel.

In getting them off the barges there is nothing to equal a pair of shears made up of navy spars. In erecting this the navy and garrison gunners can lend a hand.

If there is no tide, as in the Mediterranean, you can often run heavy loads, like engines and tenders, straight ashore on rails. But if you have to bring them up an elevated coast, I have found an incline of two rails on crib piers with a sledge made of rails and sleepers, upside down, running on it, an easy and expeditious method of landing stores.

Whatever it is, engine frame, under frame of truck, sets of wheels, boiler and fire-box, etc., it is hoisted on to the sledge and run up the incline by tackle rove on crab winches.

If there is time to put in a turn-table at the shore end of the pier, do so, but as a rule it will be found less troublesome to put in a triangle. You want a row of sidings for erecting your rolling-stock.

The cases in which the parts of engines, etc., are shipped should be carefully preserved. Of course the erectors will try to break them up for firewood. This should not be permitted, as these large cases can be knocked together into sheds and cupboards for storing and cleaning up the motion of the engines. Such protection is absolutely essential if you want to get your engines together quickly.

While we are on the subject of landing and erecting engines and rolling-stock, I may as well mention a few points about mechanical appliances.

There are no regular stores laid down for railway work in the field, the result being that at the outbreak of a campaign somebody at headquarters takes a list and jots down anything that he thinks will come in handy. I have found such articles as patent rail lifters, triangle gins, crab capstans, patent spike extractors, blocks of sizes, hydraulic and many other jacks, odds and ends that are quite useless.

Tools and mechanical appliances.

Crab winches should always be double geared and have a strap brake as well as pawls, and never weigh less than 8 cwt.

Winches.

Hydraulic jacks are not suitable for rough work. I know they are an article of store for the artillery and are very efficient for raising heavy

Jacks.

weights: but the heavy weights used by the artillery are made to stand jars, whereas a jar to the framing, etc., of an engine may prove fatal. Hydraulic jacks, unless constantly under examination, have an unpleasant knack of bursting their leathers, especially in hot climates, and so I prefer the screw jack.

Again, there are several patterns of screw jack. The pattern I recommend, whether it be standing or traversing, is the one with C. I. pillar. I have expended plenty of jacks of the 4-pillar pattern; they all go in the gun metal sockets.

Blocks under 15" are as a rule useless. Light tackles are not much use, and if wanted can be borrowed from the Navy or Royal Artillery.

A liberal supply of snatch blocks is advisable.

Cordage should for hot climates be white. We found that tarred rope rotted in the Soudan and became dangerously uncertain. Ordinary white hemp rope was not so bad, but Italian hemp gave us the best results. There should be a large supply of 1½ and 1 inch lashings Hambro' line and twine. Spun yarn rots very quickly in hot climates.

Crow and pinching bars should be steel throughout. The ordinary store axe for breaking up firewood is a fraud! Our men preferred a sledge hammer forged to a chisel point at one side.

Cold sets, swages, etc., etc., should be an article of store issued in dozens. Files, steel, for lathe tools, all should come out in special supplies; this saves robbing smith's boxes of the files they contain and breaking up chisels, etc., to make lathe tools.

I have seen and used various patterns of patent lathe tools with movable bits, but I never met the professional turner who preferred these to steel bars shaped by himself and tempered by the smith.

All kinds of steel don't answer the same purpose, so there should be an assortment which any leading smithy hand could specify in ten minutes.

The service forges and anvils are toys: a forge under 2 feet square is not much use except for very light work. The same remark applies to vices.

Jumpers should not be provided with a bulb in the middle; the extra weight can be made up by extra length. (Railway tools don't require, as a rule, to be carried on pack animals.) I have never seen patent

rail lifters, long levers, spike extractors, and such things used in light work except by beginners. I dare say they are valuable for heavy work in peace time.

I have a good deal to say about explosives, fuzes, and so forth, but I spare you further details of this nature which are rather too technical for a paper of this sort, but I mention a few to show how necessary it is to have these items thought out beforehand.

Finally you should have a good practical Engineer officer in charge of your tools and plant with a good system of accounting, receipt, issue, etc. He should have a separate workshop in which he can keep his tools, etc., in repair.

As the casualties amongst the tools and plant are enormous, periodical boards should be assembled to strike off losses and deficiencies. If these be put off till the close of the campaign, the result will be disaster to the Director of Railways; I have a very shrewd recollection of having to account for every barrel of powder expended on the Ali Musjid road, and I have paid up out of my own pocket for rounds unreported as expended after a fight. I mention this because many officers imagine that "On Service" the same check on expenditure of Government stores as is imposed in peace is not necessary or expected. Read Colonel Furse on the subject and if you are fond of quoting Napoleon's wars, see what Gouvion de St. Cyr has to say about the departments of the French army, or for the matter of that what Napoleon himself has to say about them.

We now come to the important question of gauge for military railway stock. I have no hesitation in fixing on the 2' 6" gauge.

I may say I was long opposed to this gauge, having a preference for the metre, which has held the market so long. Now, however, that the 2' 6" has come so much into use I withdraw my objection.

Reason for choosing 2' 6". My reasons for choosing it are—

- (1) It is sufficiently narrow for mountain purposes—minimum curve 75 feet radius.
- (2) It is not too narrow to admit of roomy rolling-stock. The wagon floors can be made 6 feet wide, inside dimensions, so that cattle trucks can be designed for carrying ponies. This I look upon as a *sine quâ non* for defensive purposes, as explained under defence, and we can carry artillery carriages and wagons without dismantling.

- (3) The stock is procurable in the market and many good designs of engines, etc., already exist.
- (4) We already have 50 miles of this gauge stored in Woolwich Arsenal with a proportion of rolling-stock, and there is every advantage in our adopting the same gauge as in England for military purposes.
- (5) The stock has been in use for many years now on the small powder line at Chatham, on which the R. E. engine-drivers get part of their training. And as this short line has bad curves and steep gradients, it is used for carrying troops and military stores of all descriptions; it more nearly approaches war conditions than any other line that I know. Hence experience on it is valuable.

The roadway I recommend is that on the accompanying table marked A. Its cost is, say, £600 per mile and it weighs 107½ tons per mile with wooden sleepers.

TABLE A.

*Estimate of Plant required for one mile of single Line of Railway,
2' 6" gauge.*

Article.	Quantity.	Weight.	Measure- ment.	Price variable with market rates.
		Tons, Cwt, Lbs.		Rate. £ s. d.
Y lb. rails, yards, assorted lengths.	3,520	55 11 43	112	£ 1 per ton . . . 204 0 0
Fish plates, pairs . . .	303	1 10 0	112	£ 7 " " " . . . 10 10 0
Bolts and nuts, No. 1 . . .	2,012	0 3 0	112	£ 2 " " " . . . 3 0 0
Spl. keys, ½ lb.	6,034	2 0 47	112	£ 1 ½ " " " . . . 21 3 0
Sleepers*, 6' x 9" x 4" . . .	2,240	47 0 0		11. 02 5 . . . 20 0 0
		107 6 95		353 13 0

* A maximum of 2,000 per mile, 4' 6" long, would suffice on a good surface.

Engine and rolling-stock.

Of engines there are several good designs, and these no doubt will improve yearly.

I recommend rolling-stock built entirely of steel for two reasons : one as a protection from fire, the other that with the addition of light plating it can be made bullet proof. The engine cabs should be provided with folding or sliding steel shutters to protect the engine-driver and fireman.

In the Soudan we had to put on rope mantlets ; these were heavy and awkward to sling. Two of our engines had very deep cabs. One of these was well plastered with bullet marks, but we never had an engine-driver hit, I am glad to say.

I discussed this point a good deal with Mr. Bell and would like to have adopted the two feet gauge with its minimum curve of 48 feet radius, but this gauge cannot carry mounted infantry and so I unhesitatingly reject it.

Two-foot gauge. Why rejected.

Disagreement with ideas of transport authorities.

I know I am at variance in this with many transport authorities who advocate small field railways down even to that with a single rail.

I have had a great deal of experience with the 18-inch gauge. As a workshop line on level ground I have nothing to say against it. It does doubtless very well at Woolwich Arsenal and in Chatham Dockyard, but out in the open across rough country it is little better than a toy, unless most carefully laid on heavy rails.

The 18-inch gauge.

Illustration from existing lines.

There used to be such a line between Borstal Convict Prison and the Medway Forts for carrying the convicts and stores to the works. It may still be in existence. As far as I know, it was a success for its very limited application, but it was carefully laid on 36-lb. rails, if I recollect aright.

In contrast with this is the trench railway laid under field service conditions on the Chatham field works ground. It is useful for carrying stores to the batteries, but the speed is dead slow and derailments constant. Of course the curves and gradients on this line are bad, but no worse than we ought to expect in war. I have never tried the single rail line ; its defence would, I think, be difficult.

Organization of train lines on lines of communications.

I have noticed in some diagrams of lines of communication the introduction of breaks in the field tramway lines, with sections of cart or camel road in between. I need hardly say

that this arrangement is practically impossible in a large campaign, as transport animals would not be forthcoming to convey heavy railway material over the gap.

If water carriage intervene, it is a different thing.*

The foregoing is a mere sketch of what we may expect to be called on to do on the outbreak of serious war. To carry this out efficiently and speedily, previous preparation in time of peace is absolutely essential.

Doubtless the railway administration could collect enough labour, skilled and unskilled, from different lines, which, together with such sappers and pioneers as could be spared from other works, would make some kind of show, after a few weeks. But this is not good enough ! A lot of men, however skilled, hastily thrown together under officers strange to them require a lot of organization before they can be brought into working order. What we want is a body of officers and men thoroughly skilled and practised in pioneer railway work ; the officers must know the men and their capabilities intimately and the men must be prepared to go anywhere at any time. Above all, they must be familiar with the materials they are expected to work with in the stress of war, and these materials must be ready before the emergency arises. I quote from Colonel Furze : " To reap all the advantages of a field railway it is obvious the plant must be kept in store ready to be shipped to the base without delay, *i.e.*, that materials and men must be ready." I say we must have an organized body ! Such a body cannot be got except by military administration, and I say it with deference, but none the less with conviction, that a railway corps is one of the first necessities to the Indian Army for large operations.

It is immaterial whether the Director of Railways belongs to the regular army or not. He may be a Volunteer ; at any rate he must be subject to Military Law for the time being. But all below him must be soldiers, ready by the terms of their enlistment to face any danger and able to defend themselves efficiently. We have already too many defenceless followers in the field ; we want no more. I may add that it requires something more than mere skill and ordinary courage to drive an engine with bullets pattering about.

Such a corps could be enlisted in India and employed in some railway works of general utility in the peaceable portions

* Note.—Major Heller here gave a practical illustration on a sketch map.

of the country, so that their removal in time of war would cause no dislocation in the railway administration.

It is not my intention to sketch out an organization of this nature, as it trenches on a subject under the consideration of higher authority, on which I would not presume to hazard an opinion.

But I am quite within my province in directing the attention of my brother officers to General Sherman's operations in Georgia, where an army was supplied for six-and-a-half months over a line 473 miles long. The corps of workmen was 10,000 strong and on one occasion replaced 35,000 sleepers and 9 miles of rails in seven days. The true defence of the line was effected by the Engineers always having men and material ready. In spite of the large and skilled railway population on which the army could call and of the fact that practically the nation was in arms, it was found extremely difficult to keep this Railway Construction Corps together till they were placed under a severe military discipline. I need not enlarge on the inconvenience likely to arise from the repetition of the thirteen days' strike mentioned by Mr. Bell.

I will not use the time-worn quotation of what is done in

Conclusion.

Germany; suffice to say that after much debate and some hesitation we have organized a small but highly efficient Railway Corps in England with a reserve capable of rapid mobilization and embarkation.

The Egyptian Army has its Railway Battalions. Even the army of the Congo has its Railway Regiment.

Is the Indian Army, the most practical army of the times, to be the only one without a Military Railway Corps?

Major Ferrier, in conclusion, invited discussion on the paper he had read, pointing out how much the lecture would gain in interest if subjected to careful criticism.

Colonel Bisset, R.E., after a short interval, rose and said he had waited for those criticisms which Major Ferrier had invited, to bring out any weak points in his arguments, and to give him the opportunity of answering any questions which might be asked. In the absence of any such criticisms or inquiries he ventured to offer the following remarks, which, though not perhaps criticisms, would be taken as his personal opinions upon some of the more important points discussed in the very interesting lecture which they had just heard from Major Ferrier:—

In the first place, said the speaker, I would like to support with all the strength which can be put into words the quotation from Colonel Furse, which lays down as an axiom that for a railway to be of use for military purposes the "materials and men must be ready."

This means not only that the materials shall be ready in store and in due proportions, but that they shall be stored in a convenient position ready to be loaded up and despatched in suitable consignments, and that everything shall be ready to lay out this material and turn it rapidly into an efficient railway, fit to help an advancing army and capable of keeping up the supplies when the army has advanced far from its base.

I would next allude briefly to what Major Ferrier says about tools and appliances, and would like to say that on military, just as on other railways, these should be treated in the same way, and with the same care as the larger materials to which my previous remarks have had reference. Nothing can be more fatal to the straightforward progress of work than a chance collection of tools and appliances picked up on an emergency in the way Major Ferrier has deprecated. A bad workman complains of his tools, but it is very hard on the good workman to find that his powers of work are limited and wasted by his being supplied with unsuitable tools, while by forethought on the part of the proper people he might have had suitable ones ready to his hand. All necessary tools and appliances should certainly be scheduled and listed as carefully as every other detail of the proposed railway must be, if the line is to be carried out with the speed which is the first requisite in the construction of a military railway. Where the making of the road-bed can be done in advance, or an existing road utilized for the purpose, it is obvious that much time will be gained, and the progress of plate-laying expedited. But the road must not be sacrificed to the railway, for the troops and their personal transport must advance by it.

In regard to the question of gauge of the military railway for India, it will probably be admitted that, seeing the use of such a railway will be mainly in the hilly districts which form the border of our Indian Empire, that the gauge should be one which is suitable for rapid construction in such country. Major Ferrier gives as a reason for not adopting the 2' 0" gauge, that the vehicles will not carry the horses of mounted infantry. This might not be in itself altogether conclusive, but he gives some admirable reasons for preferring the 2' 6" gauge—reasons in which I think railway experts generally will be entirely in accord with him. In particular Major Ferrier points out that this gauge is adopted as the military gauge in England, while it is a gauge for which a number of capable Engineers and makers in England have designed and are ready on a short notice to produce good types of engines and rolling-stock. This last point is of the first importance in my opinion, for much thought has to be devoted to these designs, and Indian railways, with their peculiar gauges, have suffered in the past from designs much behind those of England, where the wits of many inventors are sharpened against each other to produce the best design for the gauge which they all know so well. My first reason, however, for acceptance of the 2' 6" gauge would be that it is the biggest gauge that will adapt itself easily to the hilly tracts in which a military railway in India is likely to be required. I agree entirely with Major Ferrier that the gauge of the existing railway can often be pushed out for part of the way, say to a convenient and safe transfer station, with advantage—

the further the better. With regard to the proposed weight of rail, which Major Ferrier puts at 36 lbs. per yard, I have had some doubts whether a 30-lb. rail would not meet the case, but having regard to the great advantages, especially in hilly country, which attaches to a powerful engine, I think the Director-General of Railways would agree with me that the heavier rail, which will carry a heavier engine, is on the whole preferable.

I refrain from offering superfluous remarks upon the advantages of railway over other transport, or upon any of the details touched upon by Major Ferrier, and I equally refrain from more than a passing allusion to the large question raised in Major Ferrier's closing paragraphs. The subject of a military railway corps for India has been often mooted: indeed before the Afghan War I had the honour of serving on a committee to consider and report how such a railway corps could be created and maintained. But difficulties have been found, I presume, in making the long desired railway corps fit in with the working arrangements of any Indian railway during peace time; for, as Major Ferrier says: "What we want is a body of officers and men thoroughly skilled and practised in pioneer railway work;" and he will agree, I am sure, that this skill and practice must be acquired by preparation and practice in time of peace.

For preparing the road, *i.e.*, making the cuttings and embankments, pioneer regiments will be of the greatest value, both for the work they do themselves, and to give the necessary support and stiffening to the civil labour which, in spite of any contingent disadvantages, should be freely utilized to expedite the work. But the lesson of the Suakim-Berber Railway should not be thrown away, *vis.*, that the organization of the work should be under an officer responsible to the General commanding, and able to get the best work out of all the components of the labour force available.

The railway corps could not unaided do this work fast enough, and indeed would have full occupation in laying out the line in fixing the gradients, in completing the rough and ready bridging, as well as in organizing and directing the plate-laying work. And when this part of the work is done, the railway corps must be competent, without any delay and without any process of "trial and error" which at such a time might lead to great disaster, to commence and carry on the working of the railway on an efficient system, and then to give to the army that assistance and that confidence which good communications confer. With these remarks I will only say that if Major Ferrier's desire for a military railway corps for India can be met, it will be an infinite advantage in point of preparedness for times of war.

Major A. C. Yate said:—In the cold weather of 1879-80 I was quartered at Jacobabad and Sibi. In December 1879 I was ordered to march a company of the 1st Baluchis across the "put" from Jacobabad to Sibi. The march took eight or nine days. There was one march of 26 miles without water. The rear guard that day got in about 9 P.M. The extension of railway from Jacobabad to Sibi, to which Major Ferrier has referred, was then being laid down under Mr. J. R. Bell's supervision. I used to ride out from Sibi and watch the work. By the middle of March 1880 it was completed, and when recalled to head-quarters at Jacobabad

I returned by it. I quite well remember the sensation of crossing what Major Ferrier has termed a "momentum dip." A line laid at the rate of over a mile a day was necessarily rough. We soon learned its advantage. On the 2nd or 3rd April 1880 the 1st Baluchis were ordered to go to the front and protect the line that Colonel Lindsay was to construct from Sibi *viâ* Harnai and Sharigh to the Pishin. We were entrained on the evening of the 5th April, detrained next morning at Sibi, took over our transport at once, and encamped the same evening at Nari Gorge. I mention this in support of Major Ferrier's arguments in favour of rapidly laid down strategical lines in time of war. I would also make a few remarks about one other line that I have been over—one which was also laid down with all haste in the expectation of war. I refer to the Trans-Caspian Railway. The first section from the Caspian to Kizil Arvat was laid down to facilitate the subjugation of the Turcomans by Russia. The second section from Kizil Arvat through Ashkabad and Dushakh to Merv was very rapidly laid down under General Annenkoff's supervision in 1885, when the Panjdeh affair had strained the relations between England and Russia almost to breaking. The system of construction was what Major Ferrier has described as "telescopic." Officers, men, workshops, etc., were all located in the construction train or trains. I got some photographs of these construction trains when I was in Central Asia in September-October 1890, and am sorry I have not got them here. As water was in many places unprocurable, it was supplied in iron-tank trucks specially made for the purpose, similar to those Major Ferrier recommends. However, what I wish to emphasize in connection with this Trans-Caspian Railway is that it was constructed entirely by the Russian Railway Corps. I think General Annenkoff told me, or perhaps I read it in a report, that two Russian Railway Battalions sufficed for this work, the earth-work being done no doubt by local labour. It is said that as much as three versts, or about two miles of line, were laid down in a day. This was presumably the maximum, not the average.

When I was employed in the Intelligence Branch at Simla in 1886, I was asked by the then Quarter Master General to take up the subject of a railway service corps for the North-West Frontier. For some months I gave my spare hours to the study of this subject, and the result appeared in the "Journal of the United Service Institution of India."

The employment of reservists of the British and Native Army in the formation of a railway service corps, supplemented in time of war by drafts from the employés of the Indian Railway Companies, all of whom are volunteers and subject to military discipline, was the system which, to the best of my recollection, I advocated.

The Chairman (Sir Edwin Collen) then rose and said:—Ladies and gentlemen,—I feel sure that you will agree with me that we are much indebted to Major Ferrier for the excellent and practical lecture to which we have just listened, on a subject of great military importance. I am afraid that it is rather late to offer you any observations of my own on the subject, but still, with your permission, I should like to make a few remarks. It is needless for me to expatiate on the enormous advantages of the use of military railways in time of

war. These advantages have been very clearly demonstrated by the lecturer. Not only do we economise animal transport by the use of such railways, but we do what is, I think, even more important—we lessen the chances of disease, which unfortunately must always occur either in the concentration of large numbers of men and animals, or in the employment of them on long lines of communication. I think it should be remembered that we English were the first to make use of military railways in time of war. We constructed a short line from Balaclava to the camp in the Crimea, and I had the good fortune to see the second line made which ran from the landing place of the Abyssinian Expedition in 1867-68 to Komayli, which was at the foot of the mountains. I venture to think that we, with all our national mechanical talent and enterprise, should be the first among the nations in this valuable auxiliary to military operations.

I shall not of course attempt to follow Major Ferrier or Colonel Bisset in the technicalities of the subject. I wish here to acknowledge that our thanks are due to Mr. Bell for his excellent paper, which has also given us a great deal of information, and I think we shall agree that we should settle as soon as possible upon the gauge and upon the patterns of rolling-stock, sleepers, and the like, adapted to the countries in which an Indian army may operate, and I am convinced that with the combined talent of our civil and military Engineers, we shall be soon in a position to achieve such a result.

In the last paragraphs of Major Ferrier's lecture he alluded to a question which is more important, I think, than the others which I have mentioned. His remarks were directed to the necessity for some military organisation for the construction, maintenance, and working of military railways in war. Now, to my mind there is no more important question connected with the use of military railways than the one to which I have just alluded. I fear it is rather a late hour at which to address you on this branch of the subject, but with your permission I should like to draw your attention to certain leading facts and to indicate the course of the discussion which has taken place on this subject for many years past in this country. But first I will refer to what has been done in England, and I believe it will be of interest to you to know that at the outset of the Volunteer movement in 1860, certain leading Civil Engineers and Railway Managers offered their services to the War Office to form an Engineer and Railway Volunteer Staff Corps. That corps, I am glad to say, still finds its position in the Army List. It would take too long for me to explain to you the nature of its organisation, and I will only say that it was intended to form a link between the War Office and the railway authorities; that much practical work was done with reference to the concentration of troops, in showing how they could be transported by railway in the United Kingdom; that it is composed of a body of men who thoroughly know the whole railway resources of the United Kingdom, and how to utilise them for the national good. Of course a great deal has been done since in England in the formation of railway companies of Royal Engineers, to which the lecturer alluded. Those companies did good service in Egypt, and it was during active operations in Egypt that the

lecturer was able to bring to bear his knowledge of the subject with valuable results. In 1865 a distinguished General Officer of the Royal Engineers, Field Marshal Sir John Burgoyne, gave a further impetus to the practical study of the use of the military railways in war, and an impetus to the services of the corps to which I have alluded. But we had not neglected the subject in India. In 1864 Sir William Mansfield, afterwards Lord Sandhurst, made certain proposals with regard to the enlistment of soldiers on the Indian railways. Then when Lord Northbrook was Viceroy he took a great deal of interest in the subject, and obtained some of the papers connected with the Engineer and Railway Volunteer Staff Corps from home. Mr. LeMesurier, who was, if I mistake not, the Agent of the Great Indian Peninsula Railway, submitted a memorandum on the organisation of railways for war. In 1877, although it had been decided that the organisation at home of the Engineer and Railway Volunteer Staff Corps was not suited to Indian requirements, I submitted to the Government of India certain proposals in connection with various questions which had been dealt with, and I grouped those questions under the heads of railway military administration, organisation, transport, and the defence of railways. Major-General Sir Andrew Clarke, of the Royal Engineers, who was then Member of Council for Public Works, proposed that certain action should be taken with reference to the employment of military companies on the railway staff on the frontier lines, and this was formally put forward by the Public Works Department. Later on a committee was appointed, which was called the Railway Service Corps Committee, of which Colonel Bisset was a member. This committee submitted an elaborate and excellent report, and speaking for myself personally I think it was a misfortune that a railway corps was not started on the lines they indicated. I believe that if this had been done, we should have had a very valuable instrument for railway purposes. It is the case, however, as Colonel Bisset has pointed out, that the subject was beset with difficulties. At that time I was not in India,—I happened to be at home, and I had the good fortune to be employed in the Intelligence Department at the War Office under Colonel Home, a most able officer of the Royal Engineers, to whose writings on the subject of railways in war the lecturer has alluded. Under him I was able to study the subject theoretically and practically, and I was asked to read a paper on the use of military railways in war before the Railway Conference which was to assemble later on at Calcutta. I collected a great deal of information, but I am sorry to say I was unable to work it into practical shape, especially as the Afghan War broke out, I had to return to India, and other duties prevented my fulfilling my intention. The Afghan War no doubt interfered to a certain extent with the recommendations of the Railway Service Committee being carried on, but there were other practical difficulties, chiefly connected, I believe, with the Army Enlistment Act.

The subject was revived in 1885. In that year, I may mention, by the way, I had some little experience of the want of a suitable military organisation for the construction and working of a military railway,

and of the converse of the system approved by the lecturer. This was afforded by what was called the Suakin-Berber Railway. There can be no doubt that the attempt to work this undertaking by railway contractors and civil labour was a failure. The Royal Engineers were at once requisitioned to help, a railway coolie corps was organised and sent from India, the ballasting of the line was done by the troops, and the sleepers were carried by the transport. It was in this year, 1885, that an Army Railway Corps—a combatant corps—was decided upon, but unfortunately this decision was never carried into practical effect. I did my best at the time to support the proposal, as I believed, and still believe, that a military organisation of some kind is necessary for constructing and working military railways in time of war. At the same time I am bound to say that the highest military opinion of the time—this was some years ago—was unfavourable to the proposal. It was considered that in the Public Works Department we had a suitable organisation for the construction, maintenance, and management of military railways, that we could not spare men from the army nor keep a railway corps properly employed; in fact, that we should not get the value of our money, which we required for more essential undertakings. The result was that owing to legal difficulties as to enlistment and financial considerations, as well as the reasons I have mentioned, the idea of a railway service corps was for the time abandoned.

I venture to think that the question is still worthy of further consideration, and I am glad to hear that Colonel Bisset is of the same opinion. Admitting that it would cost money, and that it would not be possible, at the present time, to create such a corps, owing to financial exigencies, I feel that we may well consider how such a corps could be constituted on practical lines. I still hope that the united efforts of our military and civil Engineers may solve the problem, for among this distinguished body of men we have a vast amount of railway talent available; and I trust that, when financial exigencies permit, a railway corps may be created which would satisfy even the aspirations of the lecturer. I have explained why nothing has been done to form a railway corps or battalion. But it must not be imagined that a great deal has not been accomplished; not only has an immense improvement taken place in regard to railway transport, but with the aid of the railway officers and authorities, great labour has been bestowed on perfecting the arrangements for the concentration of troops, and for increasing the railway staff on certain lines.

I have already detained you far too long. It only remains for me to ask you to allow me to convey to Major Ferrier your cordial vote of thanks for the admirable and practical lecture to which we have had the pleasure of listening.

With a vote of thanks to the Chairman, the proceedings terminated.

There is a factor of considerable importance in connection with military railways, which, though it would hardly fall within the province of the lecturer to consider, might yet, we think, have had a place in the subsequent discussion. We refer to the moral factor, the civilising influence which a railway exercises. Camels and mules and

bullocks move into a country, die there or return, and leave no trace of their presence, but the two thin steel rails, when once they have pierced to the heart of a country remain, bearing, in some measure, to the country's centre the advantages of civilisation.

Had we, while lying idly in Kandahar for some seven months in 1880-81, built a military railway to carry our stores from Chaman, we should now, in all probability, have been in railway communication with Kandahar, and should not have had the line abruptly ceasing at Chaman, for its advantages would have been recognised, and once recognised, would have been gladly availed of. No stronger argument, we think, could be brought forward in favour of railways in war in India, where our wars are waged with savage or semi-savage tribes, than that of the civilising influences which they carry in their train.

PARTISAN OPERATIONS.*

BY CAPTAIN R. G. BURTON, 1ST INFANTRY, HYDERABAD
CONTINGENT.

The subject of partisan operations is one that does not appear to have been dealt with in our literature, owing, possibly, to the impression that no definite theory can be formulated for their conduct; nevertheless, although strict rules cannot be laid down for guidance in these operations, there are certain fundamental principles underlying them which may be found interesting and instructive, especially when viewed in the light of historical examples.

By partisan operations I do not mean those acts of guerilla or national warfare carried out by bandits, such as the Spanish guerillas who harassed the French during the Peninsular War, but I refer to independent operations of the nature of raids, performed by organized parties of regular or irregular troops, generally cavalry, detached from an army with more or less definite instructions.

The word partisan is derived from the French "*parti*," a detachment, and partisans are the members of detachments, which, separated from the main body for a more or less prolonged period, are despatched against the rear or flanks of an enemy for the purpose of causing him as much material and moral injury as possible; carrying disorder into his communications; preventing his obtaining supplies; cutting the communications between separate bodies of his troops; and forcing him to detach a considerable force against them.

A special feature of such parties is the comparative independence of their commanders. De Brack, in his "*Avant-postes de cavalerie légère*," says—

"A force is termed partisan when it operates apart from the army, on the basis of the personal inspirations of its commander, who is guided only by the most general instructions."

* NOTE.—For materials for this paper I am indebted to—

- (1) "*Partisan Operations*," by Colonel Klembovski, Russian General Staff.
- (2) "*Partisan Warfare*," by Colonel Hershmann, Russian Army.
- (3) "*Avant-postes de cavalerie légère*," by de Brack.

It must not, however, be assumed that partisan operations are entirely independent and indefinite; for the commander must receive from his General certain instructions regarding the object he has in view, whilst he can choose his own means for the attainment of that object. Moreover, in carrying out his instructions, the partisan commander should lose no opportunity of doing injury to the enemy.

Thus, in the American War in 1862, General Stuart received orders to reconnoitre the enemy's right flank, and harass his rear. At the head of 1,200 horse, Stuart turned the adversary's right flank, struck him in rear, and fulfilled his instructions in the most brilliant manner. He might have rejoined his army by the same route, but chose a roundabout way along the enemy's rear and left flank, partly because the adversary did not expect him there, and partly for the purpose of destroying the only railway by which reinforcements and supplies could be conveyed to the hostile army.

Such operations are quite within the scope of the independent action of a partisan commander.

A special feature of partisan operations is their almost exclusively aggressive character. It is seldom that a detachment of this kind resorts to defensive measures; such would only be undertaken in case the commander were unable to elude the enemy's pursuit, or if, for any reason, he desired to gain time.

Secrecy and care in preparation, swiftness, suddenness, and daring in fulfilment are necessary to success in these operations.

Partisan operations may take two different forms—

- (1) The detachment may separate itself from the army only at the required moment; may strike the enemy in rear, intersect him in one or more directions, carrying destruction in its train, and then rejoin the army, to await a favourable moment for a repetition of the raid. Having regard to the limitations of time at the disposal of the partisan for action on the enemy's communications, and the necessity for obtaining the most decisive results, in order to compensate for the risks of such an undertaking, it is necessary, for this mode of operations, to send a force of considerable strength. The primary object in this case would be to obtain the most decisive results in the shortest possible time.

HESMAR'S RAID.

FEBRUARY 1814.



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- (2) Partisan operations may assume another form. Having established contact with the enemy's rear, the partisan may remain there during a prolonged period ; he may camp on the enemy's communications, and harass the hostile force by frequent onslaughts.

Such operations were undertaken by the cossacks in 1812, during the disastrous retreat of the French Army from Moscow. The cossack hordes that swarmed round the doomed army during this retreat, harassing it continually and untiringly, contributed in no small measure to its destruction. General Bogdanovich thus characterises the mode of action of the cossack partisans in 1812—

“ Left to carry out an independent operation, the Russian partisans were obliged to take special precautionary measures ; to move, generally by night, by village roads, or even foot-paths, silently and swiftly from one place to another, and to rest in forests and ravines. No one, except the commander, knew whither he was going, or what was the object of the expedition. Having received information, from peasants or from scouts, of the approach of the enemy or his presence in the vicinity, the cossack commander, accompanied by several officers and cossacks, proceeded to reconnoitre the surrounding country and find out the strength of the enemy. Then, returning to his men, he took measures for an attack ; or if the enemy was too strong for him, he sent information to the nearest force, or to head-quarters. Information was obtained from the peasants, who served as guides, and armed themselves with weapons taken from the enemy. The onslaught on the hostile force was generally carried out unexpectedly, swiftly, and from several different directions.”

To carry out operations of this nature it is evident that a number of small parties are best, as they can more easily conceal themselves. Moreover, they are more suited to a country where the inhabitants are favourable to the partisans ; in case of hostility on the part of the inhabitants, partisan operations would usually take the form of separate raids, and of such the famous raid of the Russian Colonel Hesmar offers an excellent example.*

At the beginning of February 1814, during the invasion of France by the allied armies, the position on the Belgian theatre of operations was as follows :—

The French troops, under General Maison, having cleared Holland and the northern and eastern parts of Belgium, were

* “ Partisan Operations,” by Colonel Klembovski, Russian General Staff.

near Tournay, 10,000 strong (see map); together with the garrisons of Douay, Yprès, Lille, Arras, and other fortresses; the strength of the French was about 25,000 men.

General Maison had to hold Belgium, and draw against himself as much as possible of the enemy's force so as to weaken the other hostile armies.

Acting against Maison were the Duke of Saxe-Weimar's troops, disposed as follows:—17,000 at Brussels; 9,500 at Ath; Helvig's flying column of 300 horse at Leuse; Bikaloff's and Rebrieff's cossack regiments at Ghent: the remainder, about 5,000, were occupied with the investment of Antwerp and Bergen-op-Zoom. With this force of about 33,000 men Saxe-Weimar had to oppose the sallies of the Antwerp garrison, to hold Maison, and cover the communications of Bulow's corps with the Netherlands. Bulow was moving by Mons and Laon to join Blucher's army which was operating towards Paris in the valley of the river Enns.

On 14th February, Saxe-Weimar gave Hesmar, a Colonel of the Russian Army, the following instructions:—He was to go round by the right flank of the allied army to the French left; to pass between the fortresses of Lille, Douay, and Arras; to cut, or at least threaten, Maison's communications with France, dispersing *en route* all armed inhabitants; by proclamations to win over the population to the allied cause; to give out that his force was the advanced guard of an army marching by Arras and Amiens on Paris, and, finally, to effect a junction with Bulow's corps.

On the morning of 14th February, Hesmar's party assembled at Leuze. It was formed of Chernozuboff's Don cossack regiment of 540 lances, one squadron of Saxon Uhlans, and one squadron of Saxon hussars—the latter about 260 sabres. There was no baggage. Below the fortress of Condé the Scheldt is navigable, and nowhere fordable; most of the bridges had been destroyed, and the remainder were strongly guarded. Therefore Hesmar made for Renaix, arriving there on the evening of the 14th. Next day he crossed the Scheldt at the historic town of Oudenarde, which was afterwards occupied by Helvig, and moved to Courtray, whence a small French force belonging to the garrison of Menin had only just marched. The Burgomaster of Courtray gave up the keys of the town to the partisan leader, who remained there for the night.

Hesmar intended to seize Menin the following day, but, finding that it was occupied by a considerable garrison, he decided to move westwards to Messines, there to collect fresh

information, and thence to attempt to break through between Yprès and Lille into the northern French departments.

On the morning of the 16th February, the partisans drove back a French patrol with a few shots, and continued the march to Messines, where they arrived in the afternoon.

Information was received from scouts confirming the occupation of Menin by French infantry.

On the night of the 16th, the cossack posts, placed round the town by Hesmar, were several times attacked by small parties of French infantry, but, being on the alert, they drove them off without difficulty. In Messines Hesmar's left was covered by the river Lys, so he did not fear an attack from Lille; but his right was exposed to an onslaught from the neighbouring fortress of Yprès.

Therefore, at 3 A.M. on February 17th, observing the strictest silence, he moved with his party to Bailleul. Not far from Messines the party met with a post of four gendarmes, one of whom escaped. Fearing that this man would give the alarm, Hesmar pushed on rapidly, and reached Bailleul before its small garrison could get under arms; 20 prisoners were taken, and the remainder escaped.

Here information was received that the Prefect had fled to Cassel, taking the treasure-chest with him, and therefore remaining only long enough to feed their horses, the partisans moved on Cassel, having released two officers and some English sailors who were prisoners with the French.

At a distance of two or three miles from Cassel scouts reported a French column, 400 strong, issuing from Hazebrouck. Hesmar immediately dashed forward to intercept this force, but, owing to the enclosed nature of the country, he was unable to prevent the junction of this column with the Cassel garrison.

Cassel stands on a height commanding the whole of the surrounding country. The town was surrounded by a turreted wall, having towers at the angles, and in its centre, on the highest point, stood an ancient castle.

The slopes and the heights round the town were covered with gardens and vineyards, useful for defensive purposes.

On the approach of the partisans, the garrison of Cassel, consisting of from 300 to 400 recruits, occupied the walls of the town, whilst the troops which had just arrived from Hazebrouck were extended in the vineyards that clothed the slopes of the plateau.

Wishing to alarm the enemy by signalling the commencement of his raid with a decisive success, and trusting to a

surprise, Hesmar led his force to the assault at 3 P.M. Owing to the nature of the ground a mounted attack was not to be thought of, so the partisan leader dismounted a squadron of hussars and a cossack sotnia; the former moved to the left of the Lille road, the latter to the right.

The defenders replied with energy to the fire of the assault. But the cossacks were not to be denied, and, covered by the gardens, they pushed forward and drove back the Frenchmen on the eastern slope of the hill. The Saxon hussars, however, not as well armed as the cossacks, and less used to fighting on foot, could not drive back their opponents, and even held their own position with difficulty. Then Hesmar directed the dismounted hussars to once more advance to the assault, and ordered a squadron of Uhlans to charge the enemy on the road, and, availing themselves of the disorder produced, to break into the town together with their retreating adversaries.

The second attack was equally unsuccessful; some of the French were driven into the town, but succeeded in closing the gates; whilst the remainder entered by other ways, concealed by vines. The Uhlans were driven back in disorder by a few volleys.

Seeing the uselessness of making further attacks, and not wishing to dishearten his men, Hesmar withdrew to Hazebrouck at dusk. This bold attempt had cost the partisans dear. Of their five officers, one was killed, two wounded, and one taken prisoner, whilst the rank and file lost 15 men.

That night the French garrison evacuated Cassel and retreated to St. Omer.

The same day, alarmed by the operations of Hesmar, and of Helvig at Oudenarde, and also by the appearance of a strong force before Tournay, General Maison retreated to Lille.

On 19th February, having levied a large contribution from Hazebrouck, and having sent 100 cossacks under Major Pinkler to Bruges for the organisation of a revolt against Napoleon's Government, Hesmar crossed the river Lys between Aire and St. Venant, and moved on by Lille to Pernes.

Learning there that the Prefect of the district of Pas-de-Calais was at St. Pol, and that the garrison of that town consisted only of 100 veterans, 170 recruits, and a few gendarmes, Hesmar decided to capture it by a night attack.

The partisans occupied St. Pol before the French could get under arms, but the Prefect escaped. The recruits were disarmed and sent to their homes, and some prisoners were set free.

On February 20th, the party moved on to Doulens, a small fortress with half-ruined walls, but containing a citadel in good repair.

The French were not aware of the proximity of the enemy, and were taken by surprise; thirty men were made prisoners, and the remainder shut themselves up in the citadel. At the same time a party that had been sent by Hesmar to examine the Arras road seized, not far from Doulens, 12 wagons with supplies and money.

Keeping in view the object of his raid,—to draw upon himself the attention of the adversary, and thus, as far as possible, prevent the despatch of reinforcements to General Maison,—and perhaps partly guided by a desire to avenge his failure at Cassel, Hesmar resolved to lay siege to the citadel, and ordered gabions, fascines, and storming ladders to be prepared.

The enterprise was a difficult one, and attended by great risk, owing to the proximity of the fortresses of Arras, Amiens, and Abbeville.

At 9 A.M. next day, a scout brought information that a force of 1,000 infantry and a squadron of cavalry was advancing on the Arras road. Leaving the Uhlans at Doulens, Hesmar galloped off to meet the enemy with the remainder of his force, and attacked and dispersed him three miles from Doulens, taking prisoners three officers and 20 men.

As a result of this victory the Doulens garrison surrendered the same evening.

On February 22nd, the French advanced against Doulens from two directions. The troops defeated by the partisans the previous day, reinforced by 150 infantry and 150 gendarmes, advanced from Arras; and from Amiens came a column of 300 infantry and 150 Uhlans.

Hesmar moved against the Arras column, and fought an indecisive action, but the French returned to Arras towards evening. In the meantime the other French column met with a detachment of 100 cossacks, sent by the partisan leader to observe this portion of the hostile force, and, taking it for the advanced guard of a larger force, retreated on Amiens. On the 23rd, Hesmar occupied himself in strengthening the citadel of Doulens. That night spies gave information that, on the 24th or 25th, the French contemplated making an attack from three sides simultaneously, from Arras, Amiens, and Abbeville. It was impossible to remain in Doulens, especially as the inhabitants, being aware of the numerical weakness of the partisans, might rise against them.

On the evening of the 24th, Hesmar marched to Roye. Here he heard of Napoleon's victories at Montmirail and Etoges, and of the general retreat of the allies. It was impossible to think of a further advance towards Paris, nor could the partisans remain where they were, in view of the hostile attitude of the inhabitants.

Therefore, the junction with Bulow must be expedited, more especially as the French victories might radically alter the allies' plan of action.

By night Hesmar moved on to Noyon and, much to the discomfiture of the inhabitants, occupied the central square of the town at 2 A.M. Remaining there only long enough to release prisoners, disarm the inhabitants, and change his lame horses, the enterprising commander moved his party along the right bank of the Oise to Chauny, where he intended to cross the river.

Taking the advanced guard of the party for hostile deserters, the inhabitants allowed it to enter the town, then closed the gates, and commenced firing on it from both sides, killing and wounding five cossacks, and making prisoners of the remainder. Hesmar, hearing the firing, galloped to Chauny, burst open the gates, and thundered like a storm into the town, destroying all on his way. Alarming the inhabitants by declaring that he would pillage the town, the partisan leader demanded that the bridge, which had been destroyed by the inhabitants, should be repaired within two hours, and then crossed to the left bank of the river, leaving a squadron of Uhlans to hold the bridge.

On the 28th February, the junction with Bulow was effected.

Thus ended Hesmar's raid, which was carried out in the most brilliant manner, and fully illustrates the character of partisan operations. Such an example, taken from history, is far more interesting and instructive than a bookful of theoretical observations. The American War of 1861-65 furnishes many examples of partisan operations. One of the most brilliant was the raid carried out by Stuart, the famous cavalry leader of the Southern States, in June 1862. At that time the army of the Southerners occupied a strongly-fortified position at Richmond; opposed to it, at a distance of some three miles, was the Northern Army, 100,000 strong, with its base at White House, whither supplies were brought by boat up the York River. Intending to assume the offensive, the Southern Commander, General Lee, instructed Stuart to

carry out a reconnaissance of the enemy's position, and to harass his rear.

On June 25th, at the head of 1,200 horse and 3 guns, Stuart left Richmond, and moved northwards. Next morning at daybreak he passed round the enemy's right flank, and took him in rear, defeating several detachments; he also destroyed a railway by which supplies were brought from the White House, burnt some ships and wagons, a goods train, and a station, seized some transport, and destroyed a magazine.

In the meantime scouting parties reconnoitered in detail the enemy's position. Stuart then halted for three hours to collect his scouts and detached parties. By night the force continued its march, crossed the river Chickahominy at dawn, having repaired the bridge, which had been broken, and returned to Richmond on June 27th, having passed completely round the hostile army.

As regards the relative importance of partisan operations in offensive and defensive warfare, it may be remarked that the attacker generally acts in a hostile country, where the population is inimical to him, his rear lines of communication are nearly always longer than those of the defence, and are consequently more vulnerable, whilst the aggressor frequently leaves in his rear fortresses in the enemy's hands. Hence it may be affirmed that a defensive war is more favourable to partisan operations than an offensive one.

Moreover, such operations in their results are more important for the defence. The enemy usually, from the mere fact of his assuming the offensive, has both moral and numerical superiority on his side, and the theatre of operations is in his hands; hence, for the defenders, it is especially important to weaken the enemy in front, to draw part of his strength to the rear and flanks, to shake his moral force, and, as far as possible, limit his enterprise and his freedom of action. And all such problems can be solved by the development of a system of partisan raids.

As we have already seen, even isolated raids can be of great service during a campaign; it is therefore desirable to undertake them from the very commencement to the cessation of hostilities, when their uninterrupted character will ensure the attainment of more important results, for after each raid the adversary will repair the damage caused by it with greater difficulty.

Great care is necessary in projecting a raid with a considerable force during the period immediately preceding a

battle, especially when the army is not rich in cavalry, and is numerically inferior to the enemy in that arm. The partisan detachments may not succeed in rejoining the main body of the army at the decisive moment, and the latter, deprived of the immediate co-operation of a part of its cavalry, may risk a reverse on the field of battle, which will not be compensated for by the most brilliant results of the raid.

Thus, in May 1863, the Northern Army, 100,000 strong, standing on the left bank of the Rappahannock, opposite Fredericksburg, crossed at Kelly Ford, and moved towards Chancellorsville against the Southern Army, which, to the number of 50,000 men, occupied a strong position at Fredericksburg.

Simultaneously 5,000 cavalry under Stoneman were sent to the rear of the Southerners, to destroy the Richmond-Fredericksburg Railway, their line of communication with the base. Stoneman reached the rear of the Southerners, and sent out a number of parties, which destroyed the rail almost as far as Richmond, burnt a lot of the enemy's baggage, and published abroad among the negroes the law regarding the abolition of slavery.

But this raid was inopportune, for in the meantime Hooker was attacked at Chancellorsville by the Southerners, and, owing to the want of cavalry on his right flank, sustained a decisive defeat, which almost nullified the results of Stoneman's raid.

As an example of inaction, when partisan operations would have been most useful, we may take the case of Bazaine, who was beleaguered in Metz for ten weeks, and made no use of the twenty-nine cavalry regiments that formed part of his force.

Before being completely invested Bazaine might have sent a great part of this cavalry, in the form of partisan detachments, to the right bank of the Moselle, which was weakly occupied by the Germans. There, also, were all their parks and transport, the destruction of which would have placed the invaders in a critical position.

The French cavalry might also have been occupied in the destruction of railways in rear of the German Army, and in the organisation of a national war in Alsace, which would have greatly influenced the subsequent operations.

The choice of a leader for a partisan detachment is a matter of the first importance, for the success of the whole undertaking depends entirely on his energy and resource.

The commander should possess a love of adventure, a desire for dangerous enterprise. He should be bold and fearless, yet cautious at times ; he should be enterprising and cool-headed, and able to hold his own under the most difficult circumstances ; he should be able to inspire his inferiors with confidence and respect, and should be able to maintain the strictest discipline. John Stuart, the commander of the cavalry of the Southerners in the American War, was an ideal partisan leader.

The life of the prairies was most suitable to his tastes. Now hunting on the prairie, now chasing wild animals, or pursuing Indians, Stuart was a bold and tireless rider, who passed days and nights in the saddle, and acquired a passion for adventure, which became to him a second nature. He was always to be seen in the front line, and frequently in the centre of the enemy's position. He always undertook the most dangerous enterprises, and in action was ever at the post of danger.

"CAVALRY FIELD HOSPITALS": A SCHEME FOR RENDERING FIELD HOSPITALS CAPABLE OF ACCOMPANYING A CAVALRY FORCE IN THE FIELD.

BY SURGEON-CAPTAIN BRUCE SETON, 1ST CENTRAL INDIA HORSE.

The necessity for consideration of special medical arrangements, both as regards material and personnel, for masses of cavalry acting independently of an advancing army has not been sufficiently recognized in existing regulations for field service. It is true that, to a very limited extent, the principle has been admitted that a regiment of cavalry or a horse artillery battery does require some modification of the material supplied to other more slowly moving branches of the service, inasmuch as, when on the march or on field service, each of these units carries with it a specially designed "Cavalry Bag" of surgical necessities as part of the regimental medical equipment.

But beyond this there would appear to be no recognition of the immensely important fact that the celerity of movement of the mounted branches and consequent increased distance covered by them are factors which necessitate a greatly modified ambulance system to that which suffices for the relatively slowly moving mass of an army. That this problem has not presented itself in a more pressing form, and has not been satisfactorily dealt with already, depends no doubt on the fact that, in the recent Frontier Expeditions, such as Waziristan and Chitral, there have been no cavalry operations on a scale sufficient to draw attention to the defects of the present system.

Now, it is laid down in Cavalry Drill, Volume II, that at the commencement of operations, long distances will have to be covered at a rapid rate by the body of cavalry, which is sent on in advance of the army; and, further, that several days march may separate the cavalry from the main body. This will apply equally in the case of a Cavalry Division in a European campaign, and of a single Brigade operating, for example, as a screen to an Infantry Division advancing through an uncivilised country beyond our frontiers. In either case such a force is bound to be independent and to act independently of the main body in the matters of transport and commissariat, and in its ambulance arrangements.

Moreover, the front of such a cavalry screen will extend for many miles, and the screen itself will consist of units

(whether squadrons or regiments) separated from each other by appreciable distances; so that the problem of affording even temporary aid to the casualties, which must occur, is a far larger one than appears to have been recognized when the Equipment Tables now in force were compiled.

Recognizing to the full that, in the case of advancing cavalry, it may be necessary to sacrifice men who are sick and wounded to the exigencies of the service, and this to a greater extent than in the case of the more slowly moving infantry, the question still arises—How far are the arrangements at present laid down in any degree adequate to the fulfilment of the functions of the medical services, *viz.*, rendering aid to the greatest number possible of wounded and sick, sending them back to the rear, and relieving the fighting machine of the encumbrance entailed by the mere existence of men in other than a normal state of health?

To answer this question, let us consider briefly the medical establishment which would accompany a Brigade consisting of one British regiment, two native regiments, and one battery, royal horse artillery.

Each unit would have its regimental establishment, consisting of one medical officer, one subordinate, a very limited quantity of surgical equipment, and a dooly (two doolies in the case of British troops).

It is expressly laid down that this establishment is for the treatment of slight cases, the administration of first aid regimentally, "pending transfer to the field hospital."

There would be also two field hospitals, one for British and one for Native troops, for each Cavalry Brigade.

The personnel equipment of these may be roughly tabulated as follows:—

TABLE I.

Personnel and Equipment.	British Field Hospital.	Native Field Hospital.
Medical officers ...	4	4
Assistant Surgeons ...	8	...
Hospital Assistants ...	...	8
Ward-servants, etc. ...	47	19
Kahar establishment ...	About 129	About 129
Ambulance mules ...	80	80
Ambulance drivers ...	About 28	About 28
Surgical equipment ...	112 packages	92 packages.
Pakhal mules ...	4	4

Admirable as this establishment is, both as regards quantity and quality of its component parts, it is evident that its serviceability must depend on its power to fulfil the functions which are its very *raison d'être*, and these at the time and place where they are required.

Can any one who has seen a field hospital on the march, with its painfully elongated and heterogeneous line of doolies and kahars, ambulance mules and transport mules, followers of every class and laden camels, moving along at a pace which, slow at first, becomes hourly slower,—can any one, who has seen this sight conceive that such a body, however well equipped in itself, could ever be other than an encumbrance to a force the success of whose movements frequently depends on the rapidity of its advance? How could such a field hospital keep up with a Brigade advancing perhaps twenty miles a day for a number of days?

And if this argument applies to the main body of the Brigade, how much more is it apparent in the case of the regiment which is thrown forward to supply the advanced squadrons and patrols several miles further ahead, and which daily perhaps comes in contact with an active enemy.

With the best endeavours on the part of medical officers it is, on the face of it, *impossible* that under the present system adequate surgical assistance shall be forthcoming when needed.

But is it to be admitted that the mere fact of a body of troops being rapid in movement is to debar that assistance being afforded to its sick and wounded, to afford which the medical services exist? Not at all. The present system must be altered to suit the circumstances of the case. And this can easily be done.

In the first place, there must be a greatly extended recognition of the principle that the medical arrangements for a cavalry force *must* necessarily be far more mobile than those which amply suffice for infantry. In fact *Cavalry Field Hospitals* must be organized, differing from the ordinary field hospital in every particular requisite to ensure the great essential, mobility. If this can be done, as seems possible, without any increased expense, so much the better; but even were considerable outlay incurred to effect the purpose, better that outlay and efficiency than blind adherence to a sealed pattern, and failure at the crucial period.

Suggestions for the Cavalry Field Hospital.

1. The present arrangement into four independent sections is an admirable one. However, since with the existing scale

of equipment, any particular section detailed to accompany a small force would be seriously hampered by its large mass of stores, etc., even with the reductions (to be detailed) which might be made in these stores, it would be necessary to leave the more cumbersome articles with the heavy baggage of the Brigade. Any part, therefore, of its equipment over and above absolute necessities should be left in charge of one section, which would throughout act as a "base" to the other three, would act as a reserve of drugs, etc., for them, would as far as possible relieve them of sick and wounded, and leave them free to accompany any unit, such as a squadron or a regiment, when on detached duties. This "base" section could either accompany the main body of the Brigade, or come on, as rapidly as possible, with the baggage.

2. *Ambulance Transport*.—This would appear to be the best place to consider this most important question, more especially for the reason that the creation of a mobile Cavalry Field Hospital at no extra expense to Government is rendered possible only by altering the whole system as at present existing. There are two available modes of transport in a field hospital; for "lying-down cases" 20 doolies are provided, and for such as can ride, 80 mules equipped with a new pattern of ambulance saddle. With a body of troops on the march, the majority of casualties will consist of cases of fever, dysentery, and collapse from exertion or heat. These will be carried in doolies for the obvious reason that they could not ride. Besides these, we must consider the possibility of men being wounded, or thrown from their horses, and having to be carried.

It may fairly be concluded, therefore, in the case of a cavalry force, that the majority of cases requiring assistance will be lying-down cases. From march to march the sick of previous days will also have to be carried, until arrangements can be made for sending them back.

To do all this a field hospital has 20 doolies. Each dooly is carried by six kahars, and the total establishment of these is 120.

Now, the dooly-bearer, or kahar, is popularly believed to be an untiring, patient, and, in his own way, skilful beast of burden. This theory has as much truth as most such popular beliefs.

When the Waziristan Force was mobilised, the greatest difficulty was experienced in raising kahars, even after depleting regimental hospitals down country. Men were swept in from the bazaars of Mooltan, Ferozepore, and similar places,

and, after passing a medical examination, were set to carry doolies. Many of these men, when questioned by the writer, admitted that the work was completely new to them. Add to this that even the old-time regular kahar was innocent of the very rudiments of ambulance work proper, and the result may be imagined.

It is in the personal experience of the writer that the average rate of progression of a laden dooly is certainly not above two miles an hour, and this with halts every quarter of a mile or less to change shoulders; however, the kahars frequently either stumble, or from sheer exhaustion let the dooly drop. This occurred, in the case of the writer, twenty-three times in one march.

It is obvious that lying-down accommodation must be provided; so that the dooly establishment would have to be replaced by some other means of transport. This could easily be done.

The establishment of doolies is a very costly item, as the following table will show:—

TABLE 2.

Cost of Dooly Establishment for a six months' campaign.

	Rs.
1. Cost of free kit for 129 kahars at commencement at (roughly) Rs. 3 a head	387
2. Pay for six months at an average of Rs. 8 a month (including batta)	6,192
3. Cost of free rations for six months at an average of Rs. 2-8-0 monthly	1,935
4. Pensions of drivers } No estimate possible.	
5. Transport of drivers }	
Total	8,514
or a monthly average of	1,418

This establishment then, adapted to carry 20 doolies, costs Rs. 1,418 a month, or Rs. 8,514 for a campaign of six months' duration.

In place of these substitute mules, carrying litters. A cavalry baggage mule does day after day carry as much as three maunds of kit, and this without stumbling; and such a mule will cover long distances day after day, at twice the pace of a laden dooly, on the most meagre rations. Compare the cost of substituting mules for doolies, premising that each mule carries a pair of litters.

TABLE 3.

Cost of Litter Mule Establishment for six months.

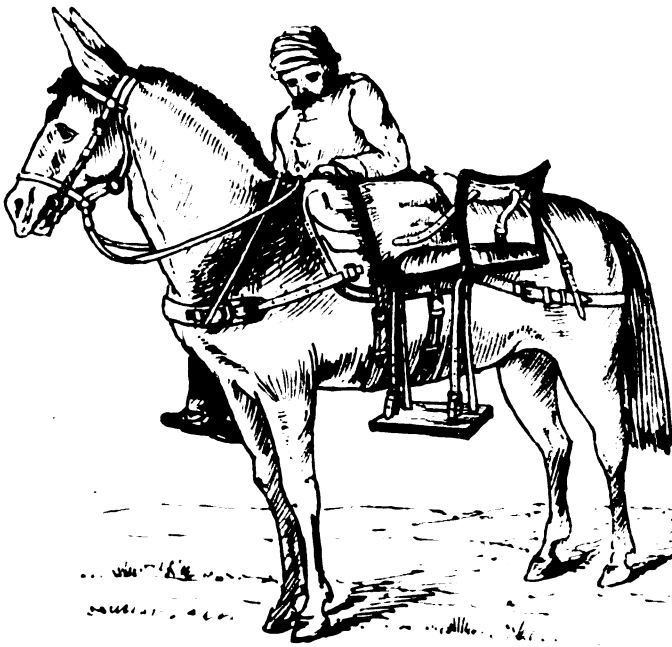
	Rs.
1. Rations of 10 mules at, say, Rs. 12 per month . . .	720
2. Pay of five drivers at Rs. 9, including batta . . .	270
3. Rations of five drivers at Rs. 2-8-0 . . .	75
4. Free kit of five drivers at commencement of campaign at Rs. 3 a head . . .	15
5. Pensions of drivers. }	
6. Transport of drivers. }	
Total . . .	1,080
A monthly average of . . .	180

Supposing this mule establishment to be doubled, *i.e.*, 20 mules carrying 40 litters, with 10 drivers, the monthly upkeep should still only be about Rs. 360 as against Rs. 1,418 for the maintenance of 20 doolies, and the pecuniary saving would be Rs. 1,058.

The *Mark III* litter weighs 106 lbs. (roughly $1\frac{1}{4}$ maunds) per pair. It is evident that the mule which can carry a laden pair of these, or about five maunds, must be of a finer stamp than the ordinary undersized commissariat mule; mules of the type required, however, are to be found in every mountain battery, and the limited number required for a few cavalry field hospitals should not be difficult to obtain.

As to the initial expense of purchasing the mules. It is shown above that over Rs. 1,000 would be saved monthly by the suggested alterations. In six months a sum of Rs. 6,000 would have been saved. Now a mule of the type required can be purchased for from Rs. 400—500. Taking the higher price, the saving alone would buy 12 out of the suggested 20; and it must be remembered that at the end of the campaign these mules would be available for ordinary transport work. So that in the long run Government would gain on the transaction.

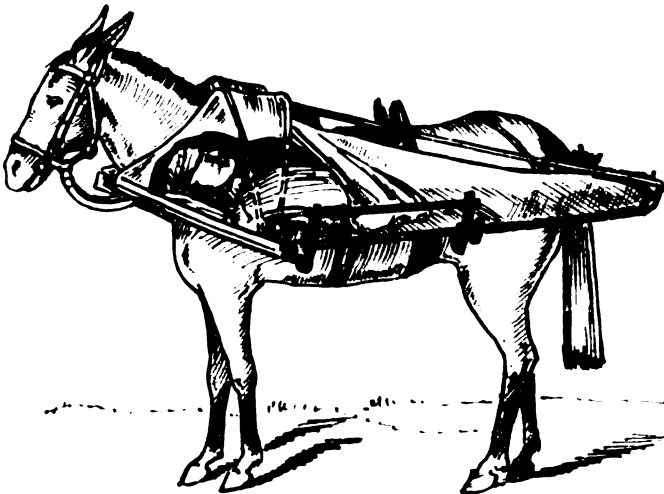
Finally, of the 80 ambulance mules already allowed, a proportion at least might be equipped with *cacolets*. Many cases of injury occur where men cannot ride, and yet are not bad enough to require a dooly. Cacolets for these would be invaluable; and here again, as each cacolet mule would carry two men if we can obtain the few larger and more powerful mules necessary, we should increase the carrying capacity of the hospital.



I.

CACOLET FOR CARRYING WOUNDED MEN,

Fitted with cushions, back and waist straps, slings and foot boards (weight 56lbs. per pair).



II.

HORSE OR MULE LITTER,

Fitted with straps, hood, pillow and apron
(weight 106lbs. per pair).

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To sum up, the following is the alternative now suggested, and by its side is shown the present establishment :—

TABLE 4.

Comparative Table of existing and suggested ambulance.

No. 1.—Existing Regulations.	No. 2.—"Cavalry Field Hospital."	
1. Doolies . 20 } Bearers . 129 } Carrying 20 sick.	1. Litter mules . 20 } Drivers . 10 } Carrying 40 sick.	
2. Ambulance mules . 80 } Drivers . 24 } Carrying 80* sick.	2. Ambulance mules— A.—Cacolet mules . 40 Carrying 80 sick. B.—As in No. 1† 40 Carrying 40 sick.	
Total . 100 sick.	80 120	
	Total . 160 sick.	

* All these would be riding cases, *i.e.*, on the ordinary ambulance saddle.

† Riding cases, as in No. 1.

So that the Cavalry Field Hospital would be able, in an extreme case, to deal with 160 sick and wounded, and each "Flying section" recommended above, with 40 cases. Finally, in the case of a troop being detached, it would be possible to send with it at least a litter and cacolet mule, whereas a dooly would be conspicuous to the enemy, slow, unwieldy and invariably lagging behind.

3. *Personnel*.—There are too many followers in a field hospital. Though the substitution of 10 drivers (for the litter mules) for the 129 kahars would make a very great difference, the defencelessness of the hospital would still exist.

The drivers should be enlisted soldiers, exactly like those in mountain batteries. Had there been 50 armed drivers in the two field hospitals at Wano, instead of some 250 defenceless followers, the mortality would have been less and the Waziris would not have been able to cut up half the hospital.

transport as they did. The actual expense of having soldier drivers would be very little more than that of the same number of commissariat drabies; while in peace time they could be fully and most usefully occupied in learning stretcher drill, "first aid," etc. It is, perhaps, unnecessary here to point out that a kahar is not trained in any way; and yet on him will devolve the duty of lifting sick and wounded men into doolies.

The whole of the drivers, whether ambulance or transport, would, if armed, form a most useful defence to the hospital; and from the fact of men being soldiers there would be no chance of their not being forthcoming in action, as occurred at Wano, when, after the first volley into the hospital camp, not a kahar could be found, and the medical staff had to bring in the wounded.

4. *Equipment.*—The latest alterations in the equipment of field hospital are excellent in every way. The total number of packages has been reduced, and heavy drugs have been in many cases replaced by lighter or less bulky ones. If only this were extended, and the excellent "soloids," "tabloids," etc., obtainable nowadays more generally substituted for made up "tinctures," etc., a still greater reduction in weight could be effected.

If litter mules were introduced in place of doolies, a surgical havresack or field medical companion could be carried by each, and boxes No. 3 and 4 done away with.

The stationery is on an unnecessarily liberal scale; and two No. 12 boxes, instead of four, would amply suffice for the whole four sections. The same applies to box No. 11. Again, as flying sections could not carry with them all the clothing and blankets allowed in boxes 13 and 17—22 (British Field Hospital) and 15—19 (Native Field Hospital), the quantity supplied should be halved, two of each only being supplied. In this way, without any loss in efficiency, the total number of packages would be reduced to 72 in the case of a British and 60 in a native field hospital.

The tentage for a Cavalry Field Hospital ought to be certainly not more than half the amount now allowed, if the amount of mule transport is not to be very largely increased. A British hospital contains some 30 tents for sick, and a native hospital 19, besides some dozen tents for subordinates, drivers, kahars, etc. Tents for the sick could be halved in number, and, if necessary, regiments could temporarily supply tents for the use of their own sick. This, however, is merely a matter of transport.

Operating tables, chairs, and office tables, except one of each, are unnecessary.

5. The transport must be entirely mule carriage. Camels are out of the question. All packages and boxes are limited to 80 lbs. weight, and could therefore be carried on mules.

The following table gives a rough estimate of the transport required :—

TABLE 5.

	British Hospital.	Native Hospital.
1. Number of mules to carry the surgical equipment, as suggested above (roughly) . . .	36	30
2. Tent mules (roughly) at reduced scale recommended	10—15	8—12
3. Drivers and followers' kits	6	4

With such a hospital as has been roughly outlined above it would be reasonable to expect that a cavalry force would be fairly equipped from the medical point of view. No doubt with every improvement that experience can suggest, men will still have to bleed to death unattended in the next big campaign, more especially in advanced squadrons, on patrols, etc.; but when the number of such victims *can* be reduced by a system of rational, relatively cheap, and certainly more efficient method of transport than at present exists, it would seem to be only fair to the service and to the individual that steps should be taken to bring about that end.

NOTE.—The value of the proposals in this paper turns to a great extent on the possibility or otherwise of obtaining a sufficiency of mules capable of carrying, say, five maunds. In reply to a question on this point the author of this article wrote to the following effect :—"I quite see that my suggestion regarding mules might be challenged as impracticable. I am aware that 270 lbs. is the outside weight in a mountain battery even. However, I enclose two drawings, one of a cacolet and one of a litter mule, with weight. These drawings are from the catalogue of the makers who supply Government, and they are identical with the drawings shown in 'The Manual for the M. S. Corps' and in Sir Thomas Longmore's 'Gunshot wounds.' So much for the litter and cacolets; and I think it is fair to assume that if mules can carry them at home, in Cyprus (as they did after the Egyptian war), and in

the French operation in Algeria, that they could carry them out here." It was further objected that doolies would still be required for the more serious cases. Against this objection the writer had some practical experience to offer: he wrote:—"As to the necessity of doolies being employed for bad cases, I most decidedly say they are not necessary. I may appear heterodox in my views, but having been carried miles in a dooly in a ghastly country, I know what it means when I was wounded through the knee; I actually had to get out and ride my own horse, as preferable to being upset every few yards. I saw a dooly carrying a man with double pneumonia upset while crossing a stream, and the patient died of the shock."

THE IMPROVEMENT OF THE PRESENT ORGANISATION OF TRANSPORT IN INDIA.*

BY BRIGADIER GENERAL G. F. YOUNG.

MOTTO: "*A chain is only as strong as the weakest link.*"

Transport is in war subjected to a more severe and continuous strain than any other part of the army machine. Hence if there are any weak places anywhere in its organisation, this strain will find them out and break the machine down. And specially so if the principles on which it is organised assume conditions common in peace but seldom obtainable in the field. And to repair the transport machine during the progress of war always involves exceedingly costly measures.

In considering, then, how our transport organisation can be improved, it is evident that there must be certain main general principles an adherence to which will preserve it from being out of adjustment to its conditions when it gets into the field, and a violation of which will cause it to contain those weak places which the strain of war will find out.

One might enumerate many such, but all can apparently be resolved into three, which stand out as great general principles vital to the above object. These are—

(I) That that portion of the "personnel" which does the supervision *must never change*. That is, that under all the varying circumstances under which transport must be ready to work in the field, constantly changing its sphere of work, the supervising "personnel" must be always the same, moving everywhere with each particular body of men and animals from the day they leave their peace station to the day they return to it. Though an opposite system may work fairly well, perhaps, under the conditions of peace, the strain of war will find out many a weak place under this head.

(II) That the system of administration must be *an exceedingly simple one*—infinitely more simple than any we have hitherto seen. Transport in the field cannot stand anything even approaching a complex system of administration.

* NOTE.—We would draw particular attention to this essay for the accurate and trustworthy data it contains in regard to the cost of proposed reforms. This is a point on which the essays have as a rule failed.

(III) A regular system for war expansion *from peace nuclei*. So that those portions of the transport which form the increase in war time shall find themselves not new bodies but parts of bodies long established, in which all matters of detail are managed on a long-established system which has been thoroughly tested in every point, however small.

2. To the above may also be added, as necessary to our present financial conditions,—

(IV) No increase of cost over that at present incurred.

3. Before proceeding to the proposals advocated, some explanation is necessary regarding each of the above principles to prove that they *are* vital general principles.

As regards general principle (I). Transport in the field must be constantly changing its sphere of work. At one time it will be wanted to convey the baggage of the troops; at another to convey the stores of some army department; or again, one regiment, brigade, or division is going to remain stationary, and the transport which has been employed with it has to be transferred to another regiment, brigade, or division; or again, the whole of one class of transport (*e.g.*, mule transport) may be required for a given movement for a particular portion of the force. Constant change therefore is the normal condition to be expected and to which the organisation must adapt itself.

Now if, while the transport is thus continually moving hither and thither, the supervising element remains stationary, the latter is dissociated from any particular body of animals and men. This is fatal; a very weak place indeed. If, for instance, the whole body of men and animals form one general department, with officers and depôts placed at particular points or with particular brigades or divisions, while the men and animals change constantly as above, the effect of this dissociation of the supervising element from any particular body of them is to cause a giving way in all those details on which efficiency depends, preventing such men and animals from ever attaining such a standard of efficiency as the Government has a right to expect for the money expended. Even the utmost energy on the part of the departmental officers will not counteract this tendency, based as it is on natural causes: at its very best such a transport can never attain the efficiency possible under opposite conditions. Its cost also will always be at a maximum.

4. The reason why transport goes so quickly to pieces, and is so costly under such conditions, is not far to seek, for

it is one with which we are thoroughly familiar in other parts of our army machine. For wherever animals and their equipment for use in the field have to be dealt with we know well that nothing but the personal supervision over the attendants of a commander *who never changes* will avail to keep the animals and their equipment in that efficiency necessary for the rough work of the field. And also it is only for such a personal commander that those attendants will work with that zeal the effect of which is to mitigate to the animals the wearing strain of hard and continuous work, poor fare, cold, etc., and so prevent their succumbing under it. We know this thoroughly well in every other part of the army machine where animals are used (*e.g.*, artillery and cavalry), and the fact is in no wise altered because the animals may be labelled "*Transport.*"

Again, in the original obtaining of the men, in the price at which they will be obtained, in the contentedness with which they will endure the hardships of a campaign, and all similar points, the fact of a personal commander who never changes makes in reality a whole world of difference. Under any system where he does not exist the men invited to take service feel that they will be "banded about" from one office or clerk to another all through the campaign, no one knowing them personally, or feeling any interest in them; hence they feel an absolute uncertainty as to who will pay them, whether they will be able to send money to their families, and what sort of treatment they are likely to receive, and they naturally are not keen to take such service. To any one who has ever had anything to do with recruiting, it is needless to point out that the above will make all the difference as to whether the men are obtained for a moderate wage, or the reverse, and whether, having been obtained, they render to Government a due return for their wages.

Again, constant change of supervision affords the maximum of opportunity for peculation in the supplies of food, clothing, and equipment, all such peculation resulting in depriving the animals of something vital to their efficiency. And on the rare occasions when any case is brought to light, before proper enquiry can be made, the animals and men concerned have gone elsewhere, and to conduct such an enquiry by letter and in the field is impossible.

5. As regards general principle (II). In peace a system which may be not a little complex, and may involve even a very considerable amount of office work, with only a minimum of attention to the outdoor work, may produce a result which will

pass muster ; but in the field all this is reversed. There, neither can the system be worked with the same regularity as in peace, nor if it could would its results suffice under the severer strain. There, nothing but the simplest of simple systems will work with that smoothness which is vital if the transport is to continue constantly working with unimpaired efficiency. There, the various matters connected with the feeding, clothing, and equipment of the animals and the payment and clothing of the men must be able to be managed (and satisfactorily managed) with a minimum of paper work, and the whole time and attention given to the outdoor work. An efficient transport in the field requires that the officers shall be incessantly with the animals ; either (*a*) on the road, seeing that they are not being given sore backs, overloaded, or otherwise misused ; or (*b*) in the lines, seeing that they are being fed, watered, and cared for, and the gear properly attended to. Every hour spent by a transport officer in the field at an office table is a loss of money to Government.

As regards general principle (III), this speaks for itself and needs no further explanation.

6. From the above considerations it follows that on no account must transport be a money-spending department. For in a money-spending department (i) we are forced to lose the personal commander, with all that is bound up in that item ; and (ii) a money-spending department involves the very reverse of a simple system of administration. It thus involves the violation of both general principle (I) and general principle (II), thereby causing the organisation to contain all those weak places to preserve it from which is the aim of those general principles, and which the strain of war will infallibly find out. Also it involves large expenditure for the control of other expenditure, which results in the amount of transport maintained not being proportionate to the amount of money expended.

7. One word regarding what is called "Regimental Transport." At the first glance it might appear that "Regimental Transport" would meet both general principles (I) and (II). But a second glance will show that this is not the case. For we have seen (paragraph 3) that such transport must be frequently transferred from one regiment to another. And the very first transfer* so made violates absolutely general principle (I). Again, such a "Regimental Transport" can only be

* The ruin of transport of such "transfers" is enormous ; for they create endless confusion in all matters in which it is vital that there should be none ; in the midst of which a machine like transport goes rapidly to pieces. After a few such transfers in succession (which almost invariably take place on the eve of a march, when everyone is

a portion of the whole transport organisation ; so that there has still to be a great money-spending department, with all the complex administrative system incidental thereto, and in which such regimental transport will participate,* and consequently an equally complete violation of general principle (II).

Lastly, a regimental transport system is inherently opposed to all power of carrying out general principle (III). It is also an expensive system.

8. The problem then is, how are we to make our transport organisation conform to both general principles (I) and (II) ; and this while it also provides arrangements to meet general principle (III) and does not violate general principle (IV).

I believe that the solution of the problem lies in independent units of transport, and these units entertained on the Sil-ladar principle. By that principle the animals and equipment are owned by the men and the monthly pay covers *everything*, whether it be pay, clothing, equipment, food of animals, hut-ting of men, replacement of animals, etc., etc.

Thus supposing the unit be 400 mules. It would have its commander (paid on the same principle), subordinate commanders (paid on the same principle), and drivers each paid so much per mule which covers everything. The unit is thus entirely self-contained, requiring absolutely nothing from any department whatever except its monthly pay cheque. And the only accounts to be checked are its monthly pay abstract. Government has thus to provide no funds for the *purchase* of anything whatever in connection with transport, and the sole expenditure being the monthly pay, the number of such units to be maintained (whether mule units, camel units, or cart units) depends simply on the amount of monthly pay which can be provided.

And outside the units themselves the sole other item required is a certain number of Staff Officers as Deputy Assistant Quarter Master Generals for Transport (eight will suffice for all India) with one Assistant Quarter Master General for Transport at Army Head Quarters ; these officers standing towards the subject of transport in the same position as the Deputy Assistant Adjutant Generals for Musketry stand towards the subject of musketry.

heavily worked already) nominal rolls of the men, lists of animals and equipment, and accounts of pay, being all made out under every circumstance which will ensure error, are full of errors, and the resulting confusion, loss to Government, and discontent among the men are interminable.

* This is proved by the remark so common on service that the paper work connected with the regimental transport equals that of all the rest of the affairs of the regiment put together.

9. Comparing this system with the general principles. As regards general principle (I), we obtain a permanent personal commander for each unit, with all those vital points which are bound up in that item; and we eliminate all those defects resulting from "transfers," the necessity for all such transfers being abolished. The gain in efficiency (in other words the doing away with "weak places") which all this means is immeasurable.

As regards general principle (II), we obtain a system* which for simplicity is absolutely unique. All paper work under the Silladar system is reduced to a minimum and is infinitely less than with any other system whatever.

10. Nor is this all. By this system we are able to get our full money's worth, since every rupee which Government pays goes to the actual transport itself, nothing being absorbed by middlemen. This means a very great deal. For the single item of the Silladar's pay represents under any other system no less than the following twelve different items (compare tables C and D):—

- | | |
|---|---|
| (1) Pay of drivers. | (7) Feed of animals. |
| (2) Pay of other establishments; <i>e.g.</i> , weighmen, peons, carpenters, blacksmiths, gomashas, etc. | (8) Replacement of animals. |
| (3) Clothing of drivers. | (9) Repair of carts, gear, and equipment. |
| (4) Clothing of other establishments. | (10) Replacement of carts, gear, and equipment. |
| (5) Hutting of establishments. | (11) Interest on cost price of animals, carts, gear, and equipment. |
| (6) Batta of establishments. | (12) Contingencies and medicines. |

And if it be realized how much on every one of these, except (1) and (6), must inevitably be absorbed by middlemen of one sort or another, and also what an amount of paper work these twelve items represent, some idea can be formed of the gain through the whole going straight to the Silladar in one lump as pay. On the other hand the ease with which such matters are arranged under a Silladar system will be known to every officer of native cavalry.

11. Again, owing to the transport being the property of the men themselves, we are able to reduce the supervising

* The use of the Silladar principle for transport was first advocated by the late Major Martin, and Bengal Lancers.

element within smaller limits; also to do without various extra establishments, such as those noted in (2) of paragraph 10. All which, while reducing the expense, also gives the great advantage of a considerable reduction in the number of followers on service.

12. By the simplicity of this system we obtain advantages in every part of the transport service; and whether it be as regards a regular system of war expansion from peace nuclei, or the training of officers and subordinates in transport duties, or the supply of attendants in each and all the simplicity of this system will carry with it advantages which will mean both increased economy and increased efficiency.

13. Nor is this all. For as regards general principle (IV) also, not only do we gain considerable savings in the annual expenditure but we also gain the following point. The exact value of the whole of the mules, camels, bullocks, carts, and equipment at present owned by Government is probably not known to any one; but supposing it to be 38 lakhs (and it can scarcely be less), this represents the sum which Government has sunk in a perishable property, and to which it must be constantly adding to in peace for the purchase of fresh transport and equipment to replace those worn out, together with very large additional sums in war for additional transport. Now by the Silladar principle this property is the property of the men; these would therefore have to buy a similar number of animals, carts, and equipment in the open market, just as Silladar cavalry buy horses in the open market. But as the Government has these to sell, the Silladars may just as well buy them from Government; consequently Government will receive back the whole of this money (by deductions from the pay of the Silladars), and hereafter would have to find no more money at all for the purchase of a single mule, camel, saddle, or other article of transport equipment, either in war time or any other time; and the raising of additional transport would cost nothing beyond the monthly pay of such transport, no purchase money having to be found.

The financial gain may perhaps be computed; the far greater gain in efficiency which the arrangements in paragraphs 9 to 12 represent cannot be measured.*

14. The subject divides itself into the following heads:—

I.—Proposals as to organisation—

(a) Composition of a troop, subdivision, and section.

* There need be no fear that such an organisation would become "too military;" moreover, care would of course be taken to promptly check any such tendency.

- (b) Interior economy details.
- (c) Administrative staff.
- II.—Proposals as to hired transport.
- III.—Proposals for war expansion.
- IV.—Financial aspect of the proposals.
- V.—Supply of officers and subordinates trained in transport duties.
- VI.—Most economical employment of transport in peace time.
- VII.—Suggestions for an experimental trial.
- VIII.—Summary of proposals.

I.—PROPOSALS AS TO ORGANISATION.

(a) *Composition of the Troop, Subdivision, and Section.*

15. The first main point is *to find the best unit*. At first sight it might appear that this should correspond exactly with the amount of transport required for particular fighting units. But not only do the requirements of each fighting unit constantly fluctuate in the field, but also we have seen that the transport must be prepared to be constantly changing (without any dislocation of its organisation) its sphere of work, both from one to another of these fighting units, and from them to other transport requirements of the army.

We must, therefore, endeavour to find, not a transport unit corresponding to the wants of any one fighting unit, but one which by its organisation will adapt itself automatically to the requirements of all fighting units (however these may fluctuate), and also to all other requirements.

16. The second main point to be provided for is that, as a component part of such unit, there must be a certain element outside that portion which does the actual carrying, which attends to the payment, the rationing, the equipment, the temporary veterinary wants, and the supervision generally of the whole. We have seen that general principle (I) requires this, and it is not too much to say that the whole efficiency of the service will mainly depend on it. Very little is really required, but that little must for efficiency in war be an integral part of the unit, moving with it everywhere.

17. The third main point is that the establishments will (whether allowed it or not) have some baggage, if it be only a blanket and a cooking pot, and that in any organisation worthy of the name this must be regularly arranged for; if not, it is certain to swell to double and treble the due amount. To see one mule in every three overloaded by having to carry this

extra weight in addition to its regular load because no arrangement exists for it in the organisation shows at once an organisation which will not stand the strain of war.

18. The fourth main point is that it is essential that every unit, and every fraction thereof, should invariably have its regular allowance of *spare animals*, even if it be only one such animal; and such never used for anything else whatever. Unless this allowance is given, not merely on paper, but *on the road*, a pack transport goes rapidly to pieces, for nowhere is it more true that "a stitch in time saves nine." Only a personal commander can ensure that spare animals are kept strictly "spare."

19. The fifth main point is that no less important than spare animals are *spare drivers*. Unless some are allowed, the death, sickness, or desertion of only a very small proportion of the drivers, leaves a number of the animals without any one to attend to their feeding, watering, or loading, except other drivers who have already as many animals as they can properly look after. The result is fatal to efficiency, meaning discontented drivers, and neglected, ill-fed animals.

20. Lastly, the above points must be arranged for, not only as regards the unit, but also as regards each fraction into which it is intended to break when required.

21. Turning now to the unit. The only way to obtain one which will adapt itself to all the conditions of the case is by first selecting such a size as is most *generally* convenient (taking all the considerations into view together), and then so subdividing this, and again dividing each subdivision, that such convenient fractions are obtained as will give the proper amount of transport to every possible case, without breaking the fraction which has been chosen as the smallest.

22. For this there are of course a dozen different ways, but the number which will best meet all the requirements is—

	Troop.	Subdivision.	Section.
(a) For mules	400 mules . .	80 mules . .	10 mules.
(b) „ camels	400 camels . .	80 camels . .	10 camels.
(c) „ light carts (with two mules) .	200 light carts .	40 light carts .	10 light carts.
(d) „ heavy carts (with two bullocks) .	200 heavy carts .	40 heavy carts .	10 heavy carts.

Each troop being divided into five subdivisions, and each subdivision into eight sections, or in the case of wheeled transport into four sections.

In the heavy cart troops the present army transport bullock cart, and in the light cart troops the present double-draught mule cart, would be used; at all events as far as those in possession by Government will go. In war, however, there are great advantages in using the ordinary carts of the country; they are quickly, easily, and cheaply obtained and repaired, and are understood by everybody, while at such times all the transport of the country should be swept up and utilised. Therefore at such times the ordinary heavy carts of the country would be used in the heavy cart troops, and ordinary "ekkas" in the light cart troops, to any extent found necessary. With a Silladar organisation no inconvenience will result even though in the same troop some subdivisions have one sort of cart and some another.

23. There would of course be no longer any of what we now call "regimental transport;" every transport troop would be for general use, and may one day carry regimental baggage, another day commissariat stores, and so on.

24. The number shown in paragraph 22 for the troop, subdivision, and section shows simply the *carrying power* of these; to this has to be added the additional animals required under paragraphs 17 and 18. But it may be convenient, before making this addition, to see how the organisation adapts itself to the wants of different fighting units. Now for this purpose it is no manner of use to work on the closely calculated statements of our equipment tables. These give a general idea, but in practice the fluctuations are so constant* that if taken as giving more than a general idea such statements will be very

- A . 400 mules (British Cavalry regiment).
- B . 100 mules (Native Cavalry regiment).
- C . 200 camels (British Infantry regiment).
- D . 150 camels (Native Infantry regiment).
- E . 130 mules (Horse Artillery battery).
- F . 120 mules (Field battery).
- G . 50 camels (Heavy battery).
- H . 110 mules (Company of Sappers).
- J . 10 mules (Brigade Staff).
- K . 20 mules (Divisional Staff).
- L . 90 camels (Engineer Park).

misleading, and in the field a source of confusion. Suppose, however, that our transport units will have to meet cases such as A to L. Sometimes the fighting unit will require more than this, sometimes less;

seldom the same for two movements in succession.

The organisation meets these and other cases thus: if, for instance, a fighting unit requires 400 mules, or 200 camels, then a mule or camel troop meets this; if 80 mules, then one mule subdivision; if 120 mules, then one mule subdivision with four

* Variations in the strength of regiments, or in particular movements the number of days supplies to accompany regiments, the amount of ammunition to accompany regiments, and similar things, cause frequent fluctuations.

sections of another subdivision temporarily attached to it (which may be shown as $1\frac{1}{2}$ subdivisions); if 20 mules, then two mule sections; if 250 mules, then three subdivisions with one section from a fourth subdivision temporarily attached to them (*i.e.*, $3\frac{1}{2}$ subdivisions).

In the same way with camels and carts. There is no combination which the organisation cannot meet, from the largest down to a minimum of ten mules, and below that it is practically never necessary to go; where three mules or three camels only are required, they can always be temporarily detached from their section as easily as a couple of sowars from a native cavalry regiment. The only general principle would be that, while a subdivision may be separated for a considerable time from the head-quarters of its troop, a section should never be kept long detached from its subdivision. The General Officer Commanding on the spot will, it is quite certain, never allow more to be detailed than is actually necessary, transport being always much in request.

The ease with which such an organisation adapts itself to the varied circumstances of war is easily seen. For example, in February 1887 the Commander-in-Chief desired that the 1st Infantry Division should, for a special reason, be equipped entirely with mule transport. With the proposed organisation any change of this sort is simplicity itself, and able to be made with, perhaps, half an hour's work. Whereas with any system of regimental transport such a change involves an entire re-arrangement of the whole transport of the army, with a correspondence extending over, very possibly, months.

25. Coming now to the "personnel," additional animals, etc.—

(a) *Command*.—The Silladar system enables us to do with very inexpensive arrangements for this purpose, such as would not suffice under any other system but are yet with this system amply adequate. The troop is commanded by a native officer,* the subdivision by a duffadar,† and the section by a tokedar.‡ Each duffadar acts as pay-duffadar of his subdivision.

(b) *Baggage animals*.—The theoretical way would be to allow a certain weight for this purpose, but the practical way is to allow one such animal to each

* A pensioned native officer of cavalry or infantry.

† A pensioned non-commissioned officer of native cavalry or infantry.

‡ The "tokedar" is merely a driver given that rank, but with no increase of pay. In camel troops he might often be the owner of all the 12 camels of the section.

section, the lowest fraction of the transport unit. This animal carries the personal baggage of the men (at 10 seers per man) and a light blanket tent (at 5 seers per man).

- (c) *Spare animals*.—The theoretical way is to allow a percentage, but the practical way is to give one spare animal to each section, the lowest fraction of the transport unit.
- (d) *Spare drivers*.—10 per cent. spare drivers are given.
- (e) *Equipment*.—Managed just as for native cavalry. One saddler per subdivision allowed in the case of mule troops and light cart troops; none for camel troops.
- (f) *Veterinary*.—One salutri and two farriers allowed to mule troops and light cart troops; one salutri for camel troops.
- (g) *Writers*.—The troop is given two writers (pensioned native soldiers).
- (h) *Establishments generally*.—The above are all that are really wanted. No "gomashtas," "weighmen," "peons," or anything of that kind are required, or desirable. What is really important is *a full complement of drivers*; over and above this the fewer other establishments the better. As regards carpenters and blacksmiths for repairs, these are simply hired from time to time as required and paid for by the Silladars.

26. The composition of the mule troop will therefore be thus (compare paragraph 22)—

Mule troop (486 mules).		Mules.	Drivers.	Saddlers.	Duffadars.	Farriers.	Salutries.	Writers.	Native Officer.
SECTION	{ Carrying baggage, stores, etc.	10	4†	...	...	...	...	...	...
	{ Baggage mule of the section*	1							
	{ Spare mule	1							
	Total	12	4	...	...	...	...	...	...

* It is to be noted with regard to all pack transport troops that whenever, either in peace or war, the work allows of the section, subdivision, or troop concerned returning to the same point at night (e.g., when working by stages), the animals noted as baggage animals of the section, subdivision, or troop are to be added as forming part of its carrying power. But not the spare animals.

† One is tokedar.

Mule troop (486 mules).		Mules.	Drivers.	Saddlers.	Duffadars.	Farriers.	Salutries.	Writers.	Native Officer.
SUBDIVISION (8 sections).	Carrying baggage, stores, etc.	80	32	1	1	...	...	...	...
	Baggage mules of the sub-division.*	8							
	Spare mules	8							
	Spare drivers . . . . .	...	3	...	...	...	...	...	...
	Total	96	35	1	1	...	...	...	...
TROOP (5 subdivisions).	Carrying baggage, stores, etc.	400	160	5	5	...	...	...	...
	Baggage mules of the troop*.	40							
	Spare mules	40							
	Spare drivers . . . . .	...	16	...	...	...	...	...	...
	Head-quarters of the troop.	...	...	...	...	2	1	2	1
	For officer commanding the troop.	1	3	1	...	...	...	...	...
	For writers and office	1							
	For salutrie and medicines.	1							
	Spare mules attached to head-quarters.	3	1	...	...	...	...	...	...
	Spare driver attached to head-quarters.	...	1	...	...	...	...	...	...
	Total	486	179	5	5	2	1	2	1

The composition of the camel troop is shown in Table A, and of the light cart troop in Table B. Heavy cart troops and pack bullock troops would be on the same lines.

* It is to be noted with regard to all pack transport troops that whenever, either in peace or war, the work allows of the section, subdivision, or troop concerned returning to the same point at night (e.g., when working by stages), the animals noted as baggage animals of the section, subdivision, or troop are to be added as forming part of its carrying power. But not the spare animals.

(b) Interior economy details.

27. The Silladar system would be worked in the transport troops on exactly the same lines as in our native cavalry, though it would of course be a much simpler matter.

As each driver has three mules or camels, or a cart with two mules or bullocks, the monthly pay instead of being fixed per man would be fixed per animal, *i.e.*, per pack mule, per camel, per draught mule, or per draught bullock, no account being taken of the man, or, in the case of wheeled transport, of the cart. Thus, supposing the pay for the pack mules to have been fixed at Rs. 13-8-0 per mule, each muleteer would receive $13-8-0 \times 3 = \text{Rs. } 40-8-0$ per month, this covering everything connected with his own pay, clothing, hutting, etc., and everything connected with the maintenance of three mules and their gear, *including their original purchase*. Similarly, the pay per draught mule (or bullock) would be fixed so as to include everything connected with the pay, clothing, hutting, etc., of the driver, the maintenance of two draught mules (or bullocks) and their gear, and the maintenance of the cart, *including the original purchase of the mules (or bullocks) and the cart*.

28. *Chunda Fund*.—For every transport troop there will be a chunda fund. This is really an insurance on the working life of a horse or mule. A man on joining a native cavalry regiment has to make good (either by paying down a lump sum, or by paying instalments from his pay), a sum of Rs. 200 for a horse. This is "horse price," though it is constantly confused with "chunda fund subscription." In addition to these instalments towards "horse price," he has to pay Rs. 2 monthly as chunda fund subscription: in return for this when his horse dies or is cast, he is supplied with a new one from the fund. The Rs. 200 "horse price" is refunded to him, or his estate on his leaving the service or dying, but the chunda fund subscriptions, being an insurance, are of course not refunded.

In the same way a muleteer in a mule troop would receive three mules and have to pay Rs. 2 a month per mule as instalment of "mule price," and Re. 1 a month per mule as chunda fund subscription. When the mule price is fully paid up, he will only pay Re. 1 a month per mule to the chunda fund. As the pay of Rs. 13-8-0 per mule has been calculated as sufficient to induce men to come even during the five years they are repaying the mule price at Rs. 2 a month per mule,

when the mule price is fully paid up, they will find themselves exceedingly well off, with a mule "assami," their own property, value Rs. 450 (paragraph 30), *i.e.*, more than a cavalry assami.

The chunda fund will repay to Government the Rs. 2 instalment of mule price, and keep the Re. 1 chunda fund subscription. Thus Government will receive on each pack mule Rs. 24 per annum. The class of men we should entertain as muleteers (paragraph 31) will thoroughly understand everything about a chunda fund, its object, and method of working.

29. In the light cart troops each muleteer, besides the Rs. 2 "mule price," will pay Rs. 2 as "cart price;" in the heavy cart troops Rs. 1-8-0 as "bullock price," and Rs. 2-8-0 as "cart price." Paragraphs 35 and 36 show that there will be no difficulty in doing this. Thus, Government will receive from each chunda fund, per annum, Rs. 24 per mule, Rs. 24 per light cart, Rs. 18 per bullock, and Rs. 30 per heavy cart. All other animals and equipment would be paid for in the same way.

In the camel troops there should be a chunda too, but as the camel owners will not be likely to understand the object of such an institution to start with, it is recommended that this should not be inaugurated at the first. After they have got used to the Silladar system, and find that on one of their camels dying they will have to purchase a fresh camel out of their own pockets, and that until so provided they will be on "dismounted pay" (Rs. 7), they will very soon propose it of themselves. Until that time comes, therefore, the men will bring their own camels, and the arrangement will be the same as the old original one in the native cavalry, where a man joined with a horse and equipment his own property, and required no chunda fund.

30. *Assamies*.—The "assami" is the value of the property held by a man in his position as a Silladar. The native cavalry sowar's "assami" (value of horse and equipment) is about Rs. 360. So that if the mules average Rs. 120 each, the value of the muleteer's assami will be $120 \times 3 = \text{Rs. } 360$, or with the three saddles and gear, about Rs. 450. An "assami," is always a much sought after thing, representing a valuable property; and above all a "muft assami" (as this will be) is always so attractive that plenty of men are certain to come forward for engagement in a transport organisation which can offer so strong an inducement as this.

In the light cart troops the assami (cart, two mules, and two sets saddlery) will be worth about Rs. 435 ; and in the heavy cart troops about Rs. 400.

31. *Class of men for muleteers.*—A great difficulty at present is how to get respectable men who can be entrusted with three mules and who know something about them. Hence our transport in the field becomes crowded with the scum of the bazaars, many of them scarcely knowing a mule's head from its tail, and full of every sort of rascality, all of course reacting on the animal's efficiency.

Under these proposals this difficulty would disappear. On nearly every durbar day in a native cavalry regiment some recruits are brought up for enlistment who are the proper zamindar class, and who are willing to pay down Rs. 100 for the privilege of getting an assami in a cavalry regiment. They have been brought up to look forward to being Silladars, perhaps to succeed to a father's or brother's assami. An immense proportion of these men are found to be under height, or too short sighted to pass in musketry, or under chest measurement. They then, thoroughly disappointed, have to try for some civil employ in which they have no interest, or go to Native States' cavalry. This class of men would not only be glad to engage as muleteers with the prospect of good pay, and a valuable assami of three mules given them free, but they would all give full security for the value of the three mules handed over to them. Having made enquiries on the subject, I find that not only is this so but also that many men would probably pay down Rs. 50 or more for the chance of getting such an assami. It must be remembered that to a man of the native cavalry class, the climax of good fortune would be to get a "must assami" in a cavalry regiment, and a man rejected as not up to cavalry standard would jump at a chance of getting an equally valuable assami in a Silladar transport without having to make any deposit, but merely having to give the easily obtained security of his relations. There is no doubt at all about this ; every single native officer, duffadar, and man interrogated on the point has said that with such an inducement they would bring their relations and give security for them.

The above are the class of men who would be obtained for the mule troops and light cart troops. They are all lost at present, as none of these men will look at service in a Commissariat-Transport department : what they want is a different kind of service altogether, *viz.*, as Silladars, and under officers who if

they go on service will go with them. Only men too small for cavalry should be taken, so as not to interfere with cavalry recruiting. They should be called "muleteers," not "drabis." Of course all mule drivers in the transport at present would have the first option; no good men among them will find any difficulty whatever in giving similar security.

32. *Security to Government.*—One of the conditions of the Silladar's pay would be that in return he should give the service we require from him, and this would include going on service when ordered. This and the stake he has in his assami would bar any chance of desertions in the case of active service. In addition, security, as above stated, to the full value of the assami will always be given for each man by his relations. The above three things together would form ample security. As a fact it is only where general principle (I) does not obtain that there is any desire to desert.

33. *Troop Fund.*—Besides the chunda fund there must be in every troop a "troop fund," answering to the regimental fund in native cavalry. It consists of a *deposit* of one month's pay from each man, and is used for purchasing uniform, equipment, etc., for the men, and for making advances to men suddenly ordered away. The willingness with which Silladars will start off at a moment's notice entirely depends on the facility for getting an advance of pay to leave with their families before starting. The troop fund makes these advances, recovering the money from the man's next pay. Each man will deposit monthly one rupee per animal until the deposit equals one month's pay—*e.g.*, in the case of a pack mule, Rs. 13-8-0, deposited in 14 months. This deposit is of course repaid to the man on discharge.

34. *Advances from Government to start with.*—These are always necessary in raising every Silladar corps until the regimental or troop fund has had time to accumulate, to meet the expenses borne by that fund. But no such large advances as are necessary with native cavalry would be required. Rs. 6,000 in the case of the mule troop and light cart troop and Rs. 2,000 in the case of the heavy cart troop and camel troop should suffice.* One-third of the advance would be repaid at end of the first year.

35. *Pay of pack mules.*—The rates at which Silladar mules, camels, and bullocks will be obtainable must be more or less tentative until tested by experiment on a small scale. But as

* In the case of cadre-subdivisions, five such subdivisions would be counted as a troop, each receiving one-fifth of these sums.

the result of many enquiries among native officers and others of the class concerned, there appears no doubt that about Rs. 13-8-0 per pack mule per month will suffice. Each muleteer in a mule troop would therefore receive Rs. $13-8-0 \times 3 =$ Rs. 40-8-0; and out of this have to pay—

	Rs.	A.	P.
(i) To chunda fund towards mule price, Rs. $2 \times 3 =$	6	0	0
(ii) To chunda fund as chunda subscription, Rs. $1 \times 3 =$	3	0	0
	<hr/>		
Total . .	9	0	0
Leaving for the keep of three mules and himself . .	31	8	0
(Out of which for the first 13 months he has to deposit in the troop fund $1 \times 3 =$ Rs. 3.)			
	<hr/>		
Total . .	40	8	0

36. *Pay of light carts.*—Similarly, the proper rate for a Silladar double-draught mule cart with two mules has to be tested by experiment. Enquiry, however, shows that about Rs. 16 per draught mule per month will suffice. Each muleteer in a light cart troop would therefore receive Rs. $16 \times 2 =$ Rs. 32; and out of this have to pay—

	Rs.	A.	P.
(i) To chunda fund towards mule price, Rs. $2 \times 2 =$	4	0	0
(ii) To chunda fund towards cart price . . .	2	0	0
(iii) To chunda fund as chunda subscription, Rs. $1 \times 2 =$	2	0	0
	<hr/>		
Total . .	8	0	0
Leaving for the keep of two mules and himself . . .	24	0	0
(Out of which for the first 16 months he has to deposit in the troop fund $1 \times 2 =$ Rs. 2.)			
	<hr/>		
Total . .	32	0	0

37. *Pay of heavy carts and pack bullocks.*—This would be arranged in the same way (of course at different rates), and need not be gone into in detail.

38. *Pay of camels.*—This would be arranged differently.

Their monthly pay would be { Employed pay . . . Rs. 12 0 0
Unemployed pay . . . „ 2 0 0

and during the months when not required they would be allowed to take private work receiving the unemployed rate of pay, this being the arrangement they prefer. Supposing each camel were six months on employed pay and six months on unemployed pay, this gives a total per annum of Rs. 84; but in order to allow a margin it has, in calculating the cost of a camel troop, been taken at Rs. 90. The pay as in all other

cases of course includes everything. As regards whether the above rate of pay would "draw," I need only mention that a camel sowar of the 1st Bengal Cavalry, a Bikanir man, on hearing of the above terms, came and said that he and his brother were joint owners of three camels, and that for those terms he would enlist his camels and his brother as Silladar at once.

39. *Camel musters*.—During the months on unemployed pay camel troop would be mustered every two months. Between musters they would go where they like within a limit of 150 miles from their station. Camel owners state that, as a rule, they do not care to take contracts more than about 150 miles from their homes; that they will cover about 150 miles in ten or twelve days, rest a day or two, and come back either laden in twelve days, or empty in ten days. Thus it would be no hardship to make the above condition. This would ensure the camels being collected when necessary within fifteen days, including the time required to send them warning, and a muster once in every two months would not injure their chance of private work.

40. *Barghirs*.—"Barghirs" (or paid servants put in charge of animals by owners) would not be allowed except in the camel troops. There they would be allowed up to a limit of the section, *i.e.*, a man owning 12 camels would be allowed to be the tokedar of a section and to have under him either three or four barghirs, receiving the pay for the whole section. It may be objected that, as a rule, the men who own camels are owners of large numbers, and that these owners will not break up their carrying trade to become owners of sections of only 12 camels. But though it is true that one man sometimes owns 40 or 50 camels, it is more usual for a family to be joint owners of 40 or 50 camels, and I hear that in that case if it were made worth their while, say, four brothers would enlist as tokedars of four sections bringing 48 camels (12 a section). Of course it would be preferable if barghirs could be prohibited in the camel troops as in all others, but the circumstances of the camel owning class require that we should meet them half-way, and the above will do this.

41. *Terms in war time*.—The following are proposed:—

- (a) Pay at same rates as in peace. For camels, employed pay (*vis.*, Rs. 12).
- (b) Free rations to both man and animal.
- (c) Warm clothing as for all followers.
- (d) Pension to family in case of death on service.

- (e) Compensation for animals lost on service. The amount to be determined under the same arrangements as in the case of horses of Silladar cavalry similarly lost.

42. *Payment of the spare drivers.*—These are practically the servants of the Silladars collectively, ready to take the place of any Silladar who is sick. They would generally be “umedwars,” *i.e.*, men waiting for the chance of a vacant assami. A share of their pay would be contributed by each Silladar to the troop fund, which would pay them. The share would only be about 3 annas per mule or camel.

43. *Native officers commanding troops.*—These would be native officers from the pensioned establishment, usually of the cavalry branch (at all events until others are trained in the details of the Silladar system). There are very many native officers who feel themselves no longer up to the standard required in these days, yet who have years of good work in them of this kind and would be glad to take the pension they are entitled to and become commanders of these troops.* Moreover, what is required from such a native officer is not smartness but reliability; he will have much responsibility, and a pension to lose will be a security for integrity. It is proposed to give them a staff pay of Rs. 80 a month (in addition to their pension), and also the rank of 3rd Class Ressaidar. Of course the position is one of greater responsibility than hitherto given to native officers, but such advancement accords with the desire of Government, and is more easily given here than in regiments. The rank and pay together should obtain really reliable men for these appointments.

44. *Duffadars and writers.*—The duffadars in the same way are proposed to be pensioned non-commissioned officers of the native army, usually of the cavalry, and the writers to be pensioned sowars. There will be greater security by employing pensioned men, and plenty will be ready to come provided the service is to be in a Silladar transport troop and not in a Commissariat-Transport department. The staff pay proposed (in addition to pensions) is Rs. 25 for the duffadars and Rs. 15 for the writers.

45. *Discipline, musters, and payment.*—Musters might perhaps be taken by the commanding officer of the nearest native regiment. He would at the same time ascertain that all ranks had received their pay. Serious offences in such a transport troop would be very rare; when they did occur, they

* This would help regimental promotion. Cavalry requires its officers to be young.

might perhaps be dealt with by the commanding officer of the nearest native regiment. Beyond these three matters all else should be left to the native officer commanding the troop, and the Deputy Assistant Quarter Master General for Transport of the circle.

46. *Pay, how to be drawn.*—Perhaps most simply done by treating the Deputy Assistant Quarter Master General for Transport as the paymaster for the number of troops under him. He would then treat the transport troops as the commanding officer of a native cavalry regiment does detached squadrons. This at all events would be the simplest arrangement to start with.

47. *Books and accounts.*—The books and accounts of a Silladar system may seem to require more supervision than could be given them by the proposed staff, but when looked into, these difficulties disappear.

Troop books.—The English books to be kept up at the head-quarters of a troop would be—

- (i) English muster rolls (copy of vernacular).
- (ii) Troop account book (copy of vernacular).
- (iii) Troop ledger (copy of vernacular).
- (iv) A small store book (copy of vernacular).

Nos. (ii), (iii), and (iv), though formidable to look at, would be simple enough, as they would only deal with the very simple uniform, equipment, etc., of a transport troop, four or five heads of account in all, whereas in a native cavalry regiment there are innumerable headings concerning their complicated uniform, equipment, weapons, etc. Nos. (ii) and (iii) would mutually check each other. The native officer would keep these in vernacular, and the English copies would only be for facility of check and inspection by the Deputy Assistant Quarter Master General.

Subdivision books.—The duffadar would keep up long roll and mule roll of his subdivision, muster rolls and acquittance rolls, all in vernacular: also a small book for each man with information about village, heir, etc.

Section books.—The tokedar of the section would have no books to keep up. His only connection with books would be to report to the duffadar if one of his men lost his small book.

48. *Reduction in the number of followers.*—Tables C and D show a reduction of 35 followers for every 486 mules, and of 21 followers for every 201 light carts. This for 33 mule troops and five light cart troops would mean a reduction of 1,260 followers, irrespective of similar reductions in the heavy cart

troops. It would mean in a force such as the late Chitral expedition a reduction of more than 2,000 followers.

49. *Supply of attendants.*—Regarding this, one need only refer to what has been said in paragraphs 30 and 31. A transport organisation having “assamies” to offer of the value of Rs. 450 will never be in want of men. The engagement* should be for three years, after which the man should, if he wished it, be allowed his discharge, provided his subdivision is not 10 per cent. short, nor ordered on service. Plenty of others will be ready to step into his “assami.”

50. *Foreign mules.*—Purchases of foreign mules in Persia, South Africa, etc., to supplement the Indian mule supply to whatever extent was necessary would continue as heretofore. All such purchases should be made by the Remount Department, and issued on payment to the troops requiring them, the chunda fund of the troop paying the Remount Department the full value of the mule on its receipt.

51. *Compensation for dearness of food* would be given as now. As it makes no difference and is difficult to calculate accurately, it has been omitted from both sides of the account in the tables. The reduction in the number of followers will cause a saving in their compensation.

52. *Ambulance transport.*—This under these proposals would be placed entirely under the Army Medical Department, for which there are the strongest reasons on the score of doing away with “weak places.” After having been so placed many improvements without increased expense could be effected here also, but such will be best worked out by the Medical Department itself. The Silladar principle would be applied to the drivers of the ambulance carts and tongas, and here as elsewhere would cause a saving.

(c) *Administrative Staff.*

53. In each division (or possibly brigade) in the field, and in each group of three or four districts in peace, there would be a “Deputy Assistant Quarter Master General for Transport” (similarly to a Deputy Assistant Adjutant General for Musketry). Eight such officers will suffice for all India, two in each of the four commands, with at Army Head Quarters one “Assistant Quarter Master General for Transport” over the whole business.† These would be purely staff officers, not

* There seems no need for enlistment.

† Their office establishments would be limited to, for each Deputy Assistant Quarter Master General an office establishment at Rs. 250 a month, including everything, and for the Assistant Quarter Master General, one of Rs. 400 a month.

departmental officers in any sense, and would have nothing to do with the expenditure of Government money. Their duties would be those of inspection and control, and are detailed in paragraphs 82 to 86.

54. At first sight no doubt it will seem difficult to believe that anything like the staff noted in paragraph 53 could possibly suffice, looking at all the immense and unavoidable mass of work, correspondence, returns, vouchers for expenditure, and many heads of account of the present system,—in a word, at the large administrative machinery involved by a money-spending department. And especially must it inevitably seem so to officers of the Commissariat-Transport Department, conversant with all the immense mass of detail with which their department has to cope, and accustomed to that system only. But it is the simple fact that the above staff is ample, and any doubt on the point will merely arise from want of familiarity with the working of the Silladar system; not with its broad principle (which can readily be grasped) but with the methods current in our native cavalry regiments for carrying out that principle in detail. It is therefore officers of native cavalry who can form the most reliable opinion on this subject, and I am quite certain *they* will have no doubt of this kind, either with regard to the amount of supervision in the transport troop itself, or with regard to the administrative staff outside the transport troops. To provide more would simply be waste of money.

II.—PROPOSALS AS TO HIRED TRANSPORT.

55. The Silladar transport is the Government transport. Hired transport to supplement the Government transport is, however, often required, though under these proposals it will be less so, since, for the same expenditure, a larger amount of permanent transport is kept up.

The two classes of occasions when it is needed are—(a) in war, transport required by the supply departments; and (b) in peace, transport required either by departments or corps for any temporary purpose, Government transport not being available.

56. As regards (a). The supply departments in war should, as a rule, have their own (hired) transport, entirely under their own control and having nothing to do with the Government transport. It is much more convenient for the commissariat and other great supply departments to have entirely independent

control over the transport they require, and hired transport is (ordinarily) best for this purpose, as it is always much more under their own control. The exceptions would be at the actual front, or whenever hired transport is not obtainable, or for some special reason undesirable; on all such occasions the supply departments would be given Government transport.

57. The method of hiring can be any that is preferred by the supply department concerned; sometimes by a simple "maundage" contract (*i.e.*, a contract for placing stores at given points by given dates at so much per maund), sometimes by a contract for the hire of a certain amount of transport either for a given time, or indefinitely. Each supply department should arrange direct with its own contractors.* Plenty of such contractors are available, and more would always appear once any demand is made known.

58. As regards (b) the matter is so simple that there is little to be said. Hired transport required in peace temporarily to supplement Government transport will be needed either (i) by regiments to carry their baggage in relief movements, or (ii) by an army department at any time. All such transport should be hired direct from the contractor by the corps or department concerned, and not through the intervention of any other department. This is the arrangement which had always obtained universally until the last few years, and still obtains to a large extent. To give an example of the latter, in the case of (i), corps, all hired transport required by native cavalry regiments in their relief movements is hired in this manner, and entirely without the intervention of the Transport Department. Again, an example in the case of (ii), an army department; all hired transport required by the Military Works Department is hired in this same manner, and entirely without the intervention of the Transport Department. And what one corps or one department can do another can do. There is not the slightest necessity for the intervention of a Transport Department or of a Commissariat Department in the matter; on the contrary every reason against it, as it only greatly increases paper work all round. Nor is any increased trouble involved to the civil authorities; their assistance should never be needed in the case of an army department; while in the case of corps, whereas the civil authority is in touch with the contractors owning transport in the district, its assistance is confined to

* Should such be necessary (which would seldom be the case), the Deputy Assistant Quarter Master General for Transport, who would be in touch with all the owners of transport in the circle, would always bring together contractors and any supply department wanting them.

ordering them to supply the transport, and seeing that their bills are paid, or (in the case of corps) a warrant for payment by the proper department given. But in reality the Deputy Assistant Quarter Master Generals for Transport would in a short time be in so much closer touch with such owners than even the civil authority, that they, instead of the civil authority, would be able to do all that was necessary.

III.—PROPOSALS FOR WAR EXPANSION.

59. General principle (III) now claims our attention. With, however, a system of transport troops organised on the Silladar principle, this otherwise difficult subject becomes exceedingly simple and easy. The arrangements, which need therefore only be given in outline, consist in forming a certain proportion of the peace transport in independent subdivisions, each subdivision (called a cadre-subdivision*) being the nucleus of a complete troop to be called up from the surrounding district on mobilisation.

Thus supposing, as a part of the peace transport, 960 camels : instead of forming these into two complete troops, this arrangement would form them into ten independent cadre-subdivisions, each the nucleus of a complete troop. The other four subdivisions of the troop would exist on paper only, and be drawn from the surrounding district, or if peace requirements involve locating the cadre-subdivision in a district which is not a camel district, then from one as near as possible. Each cadre-subdivision to have a particular district, or districts, told off to it.

60. The above provides for a multiplication by 5, on mobilisation, of all transport which in peace is formed in cadre-subdivisions. And the amount of expansion which this affords is shown in paragraph 79.

But to meet the case of a great war, the augmentation arrangements ought not to end here. Therefore it is recommended that as soon as any troop has been mobilised as above, and has marched off from the place where its cadre-subdivision has been located, a fresh cadre-subdivision of a new troop should be at once raised and located there, ready to repeat the process, if required.

As this raising of additional transport requires under the proposed system *no purchase of transport* (either on mobilisation

* The strength of the cadre-subdivision is the same as that of any other subdivision, except that it has added to it, more especially for the keeping up of the registers noted in paragraph 61, the two writers of the troop of which it is the nucleus.

or at any other time), the matter becomes very simple, and so long as the Government continues to offer such war terms as "draw," troop after troop will be mobilised in succession from that centre, with the regularity of clockwork, so long as any animals remain in the district.

61. The cadre-subdivision takes the usual peace duties, just the same as the transport at present. In addition it also maintains registers, constantly corrected, of the "disembodied" portion of the troop, *i.e.*, of the commander, duffadars, saddlers, farriers, and additional drivers and animals, which form the remainder of the troop on paper. This furnishes a record of (i) those who have actually notified that they are desirous of becoming Silladars when required and have had their names entered, or (ii) those who have intimated that they may perhaps be willing when the time comes, or (iii) those who at all events exist in the district as possible Silladars. Provided the cadre-subdivision knows what possible Silladars exist in its district to complete its other four subdivisions, the terms offered in war time by Government will do all the rest. Within a week after the terms were offered, the cadre-subdivision would be able to report whether they were "drawing," and the additional Silladars coming in, and if not then better terms would be needed. All that is certain is that the men will be ready to come on lower terms and with greater alacrity for service in a Silladar transport troop under a personal commander who goes with them, than for service under the present system.

62. Augmentation for war ought to combine with training additional officers and men in transport duties with a view to their being available for such augmentation; therefore the rest of this portion of the subject will be treated under that head (see paragraphs 82—87).

63. Regarding what amount, out of the total of each class of transport maintained in peace, shall be formed in cadre-subdivisions, and what in complete troops. The total amount of transport at present owned by Government appears to be approximately—

About 18,100 mules,	About 1,700 army transport bullock
" 1,000 light carts,	carts,
" 3,700 draught bullocks,	" 840 camels,
	" 760 pack bullocks,
	About 265 elephants,

and these therefore are what we have to deal with.

(a) *Pack mules*.—In determining what proportion of the total mules shall be organised in cadres the nuclei of a war expansion, a factor to be taken into consideration is, whether

the number of mules to which such cadres will expand exist in the country. Perhaps the portion to be formed in the complete troops might be 20 troops (*i.e.*, about half the whole number of mules) and the remainder, after deducting those required as draught mules, be formed into cadres. This would give us 20 complete troops and 64 cadres.* As to whether the number of mules required to expand the latter into 64 complete troops on mobilisation would be obtainable, see paragraph 78.

(b) *Light carts, heavy carts, camels, and pack bullocks.*—As regards all these classes of transport it would seem best to form almost the whole of each into cadres.* The amount of each maintained in peace bears so small a proportion to that required in war that it seems best devoted almost entirely to nuclei of a war expansion.

(c) *Elephants.*—The only class of transport that apparently should not come into a Silladar transport is, I think, elephants. Before 1882 these were always simply under the Commissariat Department, and their conditions are so exceptional that it seems best they should be, as formerly, simply under the Commissariat Department, and have nothing to do with the Silladar transport.

64. *Hired camels maintained in peace.*—There is no point where improvement of our present organisation would seem to have greater scope than here. There are at present about 2,300 of these camels. And they create a very weak point in our present organisation, *because these camels afford Government no nuclei of an expansion for war.* Nor at a rate of pay averaging only Rs. 70 per annum could they be expected to do so. As they stand at present the only way is to look on them as simply transport hired at peace rates for peace duties. They are therefore not included in paragraph 63. All of their owners who wished would of course be allowed to enrol themselves as Silladars in the new arrangements, and most would probably gladly do so; while from the Government point of view a difference between Rs. 70 and Rs. 90 per annum per camel would be a *most* cheap bargain at which to obtain the enormous difference in war power gained (see paragraph 79).

65. It will be seen that the foregoing proposals relieve the Commissariat Department absolutely and entirely of all

* It makes no difference financially whether the number of complete troops is greater and of cadres less, or *vice versa*, so that the respective numbers can be any that seem most convenient.

duties in connection with the supply of transport, either in peace or war. Nor need there be any apprehension that hereafter, if, *e.g.*, during a campaign, more camels were suddenly called for, the Commissariat Department might be called upon to raise them. For paragraphs 59, 60, 61, and 79 will show that so far from this being likely it would be *impossible*; for the transport cadre-subdivisions have their net-work over the whole country and occupy the whole ground.

IV.—FINANCIAL ASPECT OF THE PROPOSALS.

66. It can be seen plainly enough that the foregoing proposals would effect large savings. In every item which has been dealt with there are points which have been noted as having this effect. But as regards the exact amount of the saving, the two systems of payment are so dissimilar that by nothing short of taking the whole cost on the one side and the whole cost on the other could we arrive at it; and this we are unable to do in the absence of information as to what is the total cost of the transport at present. This latter cannot be ascertained because a large portion of it consists of (a) the pay of departmental officers, warrant officers, and sergeants, (b) the cost of the whole of the transport offices, and (c) the cost of so much of the commissariat account offices as deal with transport accounts, and all this is now merged in the general cost of the whole Commissariat-Transport Department, and is not shown anywhere separately. Yet this is required in order to arrive at the savings exactly, since most of that which corresponds to it under the present proposals forms part of the organisation itself. For instance, the four heads of expenditure (two on either side) are—

(A) Present cost.	(B) Proposed cost.
<p>(a) Cost of so many animals, vehicles, etc., with their attendants, equipment, etc.</p> <p>(b) Cost of the departmental officers, warrant officers, and subordinates [other than those included in (a)]; of the whole of the transport office establishments; and of so much of the commissariat account office establishments as deal with transport accounts.</p>	<p>(c) Cost of so many transport troops.</p> <p>(d) Cost of one Assistant Quarter Master General, with an office at Rs. 400 per mensem, and of eight Deputy Assistant Quarter Master Generals, each with an office at Rs. 250 per mensem.</p>

and as (c), the transport troops, include not only the whole of (a) but a part also of what is included in (b), we cannot arrive at the total saving without knowing (b).

So that all one can do is to show the financial effect of the proposals in a *general* way.

67. The financial gain resolves itself into—

- (a) the amount to be received back by Government as the purchase price of the present transport; and
- (b) the annual savings; giving money available for expenditure on additional transport.

68. As regards (a). The amount of transport to be purchased apparently is (paragraph 63)—

Mules	about 18,100
Mule carts (double draught)	„ 1,000
Army transport bullock carts	„ 1,700
Draught bullocks	„ 3,700
Pack bullocks	„ 760
Government camels	„ 840

These would all be purchased by the Silladars at a valuation fixed by Government. Probably a simple all-round valuation would be most convenient. And as it represents money which Government never expected to see again, it could afford to fix the valuation fairly low. At a guess the prices have been assumed as follows :—

	Rs.
Mules	120
Mule saddlery and gear, per set	30*
Mule carts (with gear)	135
Army transport bullock carts (with gear)	175
Draught bullocks (with gear)	100
Pack bullocks (with gear)	75
Government camels (with gear)	200

69. It has been shown (paragraph 29) that the chunda fund of each troop will repay Government per annum Rs. 24 per mule, Rs. 24 per light cart, Rs. 30 per heavy cart, and similarly for each other animal, etc., until its full price is paid. Supposing therefore the valuation prices to be as assumed

* The price now appears to be Rs. 54-8-0 per set.

92 IMPROVEMENT OF PRESENT ORGANISATION OF TRANSPORT.

above, the amount repaid to Government, and the periods of payment, will be—

Approximate period in which full price will be paid up.	Detail.	Amount.
		Rs.
5 years . . .	18,100 mules, at 120/-	21,72,000
5 " . . .	Saddlery and gear of ditto, at 30/-	5,43,000
5½ " . . .	1,000 light carts (with gear), at 135/-	1,35,000
5½ " . . .	1,700 bullock carts (with gear), at 175/-	2,97,500
5½ " . . .	3,700 draught bullocks (with gear), at 100/-	3,70,000
4 " . . .	760 pack bullocks (with gear), at 75/-	57,000
5 " . . .	840 Government camels (with gear), at 200/-	1,68,000
	Total	37,42,500
	Other miscellaneous transport equipment, say	57,500
	GRAND TOTAL	38,00,000

So that the whole would be repaid to Government in from five to six years, and at the rate of about Rs. 7,31,920 each year.

70. Turning now to (b), the annual savings over and above the instalments of the purchase price.

Omitting all savings resulting from the effect of general principle (I) (paragraphs 4, 5, 11, and 13), as well as others which have been mentioned, we have the following savings:—

Mule transport.—Table C shows on the one side the cost of 486 mules organised as proposed in a Silladar mule troop and on the other the cost of the same number of mules under present arrangements; and Table D shows the same as regards a Silladar light cart troop of 201 carts and 444 draught mules. These tables show that there will be an annual saving on each mule troop of Rs. 1,278, and on each light cart troop of Rs. 3,188. We have mules and light carts enough to divide up into 33 mule troops and five light cart troops. Therefore the annual saving on these would be—

		Rs.
On 33 mule troops . . .	@ Rs. 1,278 . . .	= 42,174
On 5 light cart troops . . .	@ Rs. 3,188 . . .	= 15,940
Total . . .		58,114

Heavy carts, pack bullocks, and camels.—The present cost of the 1,700 army transport bullock carts with their 3,700 draught bullocks, of the 760 pack bullocks, and of the 840 Government camels is not available, but reasoning by analogy we may expect a saving in the same way here also. The total number is, however, too small to affect the matter very much, so the saving, whatever it may be, has been omitted from the calculation.

71. *Administrative machinery.*—As already noted, this is now merged in the general cost of the Commissariat-Transport Department. But supposing the cost of this item has not increased since 1886 (and there seem many reasons for supposing that it must have increased), then the enclosure of Commissary-General-in-Chief's No. 1293-T. of 26th July 1886 showed it to stand as follows :—

	Rs.
20 departmental officers, with their office establishments .	2,69,284
38 departmental warrant officers and sergeants .	50,580
Allowances to regimental transport officers and sergeants .	49,746
	<hr/>
Total per annum	3,69,610

Against this the present proposals would have (paragraph 53)—

	Rs.
8 Deputy Assistant Quarter Master Generals for Transport (Captains, with Staff pay @ Rs. 400) =	
$8 \times 775 = 6,200 \times 12 =$	74,400
8 Offices of ditto @ Rs. 250 = $2,000 \times 12 =$	24,000
1 Assistant Quarter Master General for Transport (Colonel, with Staff pay @ Rs. 800) = $1,630 \times 12 =$	19,560
Office of ditto @ Rs. 400 = 400×12	4,800
	<hr/>
Total per annum	1,22,760

The annual saving here therefore would be Rs. 2,46,850.

As these nine officers merely represent a similar number of the 20 above noted, nothing has to be added on the score of additional officers added to the army. On the contrary, there would be the saving on this score (though this has not been counted) represented by the reduction of 11 officers, and of the 38 departmental warrant officers and sergeants, none of whom would be required.

72. As what these proposals aim at is, not to reduce the expenditure, but *for the same expenditure* to obtain more transport, it will be proper to credit the savings with the

interest on the 38 lakhs at present sunk in transport, and to be refunded. The interest on this sum at 3 per cent. would be Rs. 1,14,000.

73. So that on the above three items alone the annual savings would be—

	Rs.
(i) On the mule transport, as per paragraph 70	58,114
(ii) On the administrative machinery, as per paragraph 71	2,46,850
(iii) On the interest on money at present sunk in transport, as per paragraph 72	1,14,000
Total per annum	<u>4,18,964</u>

This of course is not the whole annual saving, many other items having been mentioned where savings will result, but it will suffice for showing (see below) what the general effect of the proposals will be.

74. An annual saving of Rs. 4,18,964 would give us, supposing the additional transport were taken in camels, 4,320* Silladar camels. This would make the 2,300 hired camels, hired at a cost of $(2,300 \times 70 =)$ Rs. 1,61,000, no longer needed.† The sum of Rs. 1,61,000 thus set free being added makes the total sum available Rs. 5,79,964.

75. With a Silladar transport an annual sum of Rs. 5,79,964 will give a considerable addition to the permanent peace transport, and also considerable power as regards arrangements for a war augmentation. The additional transport may of course be either in mules, camels, light carts, or heavy carts. It would be Silladar transport, therefore Government would have to purchase *nothing*.

(a) If taken in mules, then it would give us 26 mule cadre-subdivisions, *i.e.*, an addition to the peace transport of 2,496 mules; and these the nuclei of 26 complete troops, which would give on mobilisation $(486 \times 26 =)$ 12,636 mules.

(b) If taken in camels, then it would give us 61 camel cadre-subdivisions,‡ *i.e.*, an addition to the permanent peace transport (in place of the 2,300 hired camels) of $(96 \times 61 =)$

* $\frac{418,964}{9,300} = 45$ camel cadre-subdivisions = 4,320 camels.

† They would not necessarily be discharged; all who wished would be allowed to re-engage on the new conditions, becoming thus part of the 4,320 Silladar camels.

‡ Table G. Rs. 9,300 \times 61 = Rs. 5,67,300, leaving a balance over of (Rs. 5,79,964 — 5,67,300 =) Rs. 12,664 (see footnote to paragraph 77).

5,856 Silladar camels; and these the nuclei of 61 complete troops, which would give on mobilisation ($483 \times 61 =$) 29,463 Silladar camels.

(c) Similarly as regards light carts, or heavy carts.

76. It would seem best to take the additional transport in camels, as we urgently require a nucleus of a war augmentation of camel transport, and whereas we have materials for such nuclei in all other classes of transport we have no camels for this purpose (paragraph 64). And since the spread of railways is causing the camel trade to languish, the maintenance by Government, without increased cost, of 5,856 camels instead of only 2,300 would give a strong impetus to the camel breeding districts, making them better able to meet war demands.

77. The total peace transport would therefore amount to the following,* and would stand thus—

In 20 mule troops . . .	$486 \times 20 = 9,720$ mules	} = 15,864 mules.
In 64 cadre-subdivisions	$96 \times 64 = 6,144$ mules	
In 25 light cart cadre-subdivisions (40 carts and 88 mules $\times 25$).		} = 1,000 carts and 2,200 mules.

Total 1,000 carts and 18,064 mules.

In 2 camel troops . . .	$483 \times 2 = 966\frac{1}{2}$ camels	} = 6,822 camels.
In 61 camel cadre-subdivisions . . .	$96 \times 61 = 5,856$ camels	
In 42 heavy cart cadre-subdivisions (40 army transport carts and 88 bullocks $\times 42$).		} = 1,680 carts and 3,696 bullocks.

In 8 pack bullock cadre-subdivisions $96 \times 8 = 768$ pack bullocks.

78. It may perhaps be thought useless to form so many as 64 mule cadres (as well as the 25 light cart cadres), on the ground that the 33,860 mules required on mobilisation to complete these 89 cadres to full troops would not be obtainable. If necessary of course it is easy enough to reduce this number of peace cadres and proportionately increase the number of complete troops maintained in peace. But I do not think that the above number of cadres is excessive, and for this reason: a Silladar transport is essentially an organisation able to adapt itself to all conditions, and what would be done would be this: supposing that on the 64 mule cadre-subdivisions being

* That is, to the present transport (less 2,300 hired camels), plus the 5,856 camels above mentioned.

† The present 840 camels owned by Government with 126 more added, the money for which, *vis.*, ($126 \times 90 =$) Rs. 11,340, is available out of the balance of Rs. 12,664 shown in footnote to paragraph 75 (b).

ordered to mobilise, mules are only forthcoming for two out of the remaining four subdivisions in each troop; we should then go to the ponies; and supposing again these exhausted in completing one of the remaining two subdivisions, we should then go to the donkeys. There is no inconvenience in a Silladar troop if some of its subdivisions are composed of mules, some of ponies, and some of donkeys. So that the 64 cadres expand into $(486 \times 64 =)$ 31,104 mules, or mules and ponies, or mules and ponies and donkeys.

79. Thus, while keeping the expenditure in time of peace exactly as at present, and also paying nothing for the purchase of transport on augmentation in war, the peace transport will expand in war into the following :—

Pack mules.—20 troops and 64 cadres, expanding to 84 mule troops. } = 40,824 mules.

Light carts.—25 cadres, expanding to 25 light cart troops. } = 5,025 carts* and 11,100 mules.

Camels.—2 troops and 61 cadres, expanding to 63 camel troops. } = 30,429 camels.

Heavy carts.—42 cadres, expanding to 42 heavy cart troops. } = 8,442 carts* and 18,648 bullocks.

Pack bullocks.—8 cadres, expanding to 8 pack bullock troops. } = 3,888 pack bullocks.

Or a total in war of—

51,924 mules (or mules and ponies and donkeys).

30,429 camels.

18,648 draught bullocks.

3,888 pack bullocks.

5,025 light carts.

8,442 bullock carts.

80. It is needless to enlarge on what an immense gain in war power the figures of paragraphs 77 and 79 represent. It will be patent to everyone. It is all gained without the expenditure of a single additional rupee; and this is even supposing that the annual savings available only amount to Rs. 5,79,964, whereas many reasons have been given for expecting them to be much more.

81. But the worst of figures is that they tend to obscure those aspects of a question least able to be measured in figures. This is eminently so in the question of transport,

* The carts for these would either be (i) made up by Government and sold to the Silladars on mobilisation, or (ii) arranged by the transport troops to have made up locally, or (iii) if time pressed, ordinary country carts would be used. Similarly as regard mule saddles.

where we deal with living animals and men. The relative cost of, *e.g.*, 486 mules under this method, or that, is not the whole point, or even half of it. The principal gain to be expected from these proposals is not the financial one, great as that is, but the gain *in efficiency* which those mules will attain.

In discussing recently the lessons to be learnt from the Chitral expedition, "*The Pioneer*," with reference to an opinion attributed to General Gatacre that no animal was worthy of the name of mule which could not carry two hundred pounds in addition to its saddle, remarked: "Ordnance mules, it is true, would think nothing of such a load, *but an Ordnance mule could eat up two or three of the sort provided for transport purposes.*" This is exactly it, and it is the great gain in *this* respect which these proposals for improvement of our transport confidently anticipate; *viz.*, that the combined effects of the three factors, (i) a personal commander, (ii) so simple a system, and (iii) the mule being the muleteer's own property, will produce the result that within two years these mules will (except in height) *be equal for all practical purposes to Ordnance mules.*

V.—SUPPLY OF OFFICERS AND SUBORDINATES TRAINED IN TRANSPORT DUTIES.

82. An average circle of a Deputy Assistant Quarter Master General for Transport, supposing there are eight for all India, would contain something like the following peace transport:—

- 3 mule troops (each 486 mules).
- 8 mule cadre-subdivisions (each 96 mules).
- 3 light cart cadre-subdivisions (each 40 carts and 88 mules).
- 8 camel cadre-subdivisions (each 96 camels).
- 5 heavy cart cadre-subdivisions (each 40 carts and 88 bullocks).

This is not a bit too large a charge for one Deputy Assistant Quarter Master General to look after, because the Silladar principle makes all exceedingly simple. His chief work would be frequent inspection of this transport, in its lines and at its work, together with a constant looking into all the arrangements for augmentation, including the making himself personally acquainted with the district and its owners of transport, and the seeing that the cadre-subdivisions keep up their registers properly; also a careful watch over the chunda funds of these 27 units.

83. But even if it were too large a charge, he will have assistants. Here owing to having such a simple system, we are able to dovetail in, to the great advantage of both, the giving this assistance, and the training of other officers, both British and native. I propose that in each Deputy Assistant Quarter Master General's circle, and placed under him, there should be at all times at least two British officers and two native officers* under training; of course as many more can be trained as can be spared by regiments. The British officers would work as assistants to the Deputy Assistant Quarter Master General, and thus learn all details of transport administration; the native officers would each be put in charge of from five to ten of the cadre-subdivisions, and thus learn the whole executive work of the command of a transport troop.†

84. As many non-commissioned officers as can be spared should also be always under training. Each would be attached to a particular cadre-subdivision to learn, under its duffadar, every detail of the working of a subdivision. They would be shifted about so as to get experience of different classes of transport.

85. The period of training should if possible be six months, half in the cold weather and half in the hot weather, so as to give experience of the relief movement work as well as of the augmentation work.

86. At the end of the period of training the Deputy Assistant Quarter Master General would arrange to examine each, and from this and what he has seen of their work, grant certificates of fitness each rank for its own sphere of work.

87. On mobilisation being ordered the British officers thus trained supply the Deputy Assistant Quarter Master Generals for Transport required for the field force, the native officers supply the commanders of the complete troops to which these cadre-subdivisions are augmented, and the non-commissioned officers supply the duffadars of subdivisions in those troops. Of course all native officers and duffadars accepting these appointments on a troop being mobilised would have to go to the pension establishment on whatever pension they were entitled to; so would not deplete their regiments in any way, as promotions would be made in their place.

* If each General Officer's district gave only one British officer and one native officer to be trained in transport duties, this would give about four times the above number.

† Each would generally be put in charge of all the cadre-subdivisions at a particular station; they would seldom be so many as to require to be divided between two such native officers.

It would always be open to any duffadar who had passed the course to have his name registered for a particular subdivision in the troop to whose cadre-subdivision he has been attached.

VI.—MOST ECONOMICAL EMPLOYMENT OF TRANSPORT IN PEACE.

88. This also becomes a very easy matter with a Silladar transport. The arrangement in the case of the camel transport has already been detailed (paragraph 38). In the case of other classes of transport perhaps the best arrangement would be for the person employing a troop, subdivision, or section, etc., to pay for it to Government (through the Deputy Assistant Quarter Master General) at the same rate as Government pays the Silladar, and for Government to keep, say seven-eighths and give the Silladar one-eighth as extra pay for such work. Commanders of troops and subdivisions would be encouraged to look out for such work, and as it would bring extra pay, plenty of applications for the use of any transport that could be spared would be sure to be received by the Deputy Assistant Quarter Master General.

VII.—SUGGESTIONS FOR AN EXPERIMENTAL TRIAL OF THE PROPOSALS.

89. An experimental trial on a small scale of these proposals is perfectly easy and would clash in no way with present arrangements. To form from our present transport one or two mule troops and a few cadre-subdivisions of each class of transport, with one Deputy Assistant Quarter Master General for Transport (responsible to the Quarter Master General in India) would be a very simple affair. The carts and animals are already all owned by Government; the one or two pensioned (or to be pensioned) native officers of cavalry, together with the necessary number of pensioned (or to be pensioned) duffadars would be quickly forthcoming as soon as the terms were known; the Deputy Assistant Quarter Master General would be any suitable officer, either from the present Transport Department, who, having belonged to the native cavalry branch, is conversant with the working of the Silladar system in all its details, or one straight from a native cavalry regiment. The drivers, it has been shown, are certain to be obtained without the slightest difficulty once the terms are known, but the present transport drivers should have the first option.

90. The trial would cost nothing: on the contrary, it has been shown that every 486 mules or 201 light carts so formed will cause a saving. Moreover, besides this saving, the money would at once begin coming back to Government for the purchase price of such transport; at the rate of, for every 486 mules so formed, $485 \times 24 = \text{Rs. } 11,664$ per annum.

91. Nor would there be any difficulty supposing that after the trial Government wished to abandon it. All that would be necessary would be to re-purchase the animals, etc., from the Silladars, or repay such portion of the total price as they had paid.

92. All other points would settle themselves during the progress of the experiment, during which all details would become fully ventilated, which is in fact the very reason for such experiment.

93. In conclusion it may be noted that the proposals of this paper depend so entirely upon the Silladar system that a thorough familiarity with, not the principle of the system itself but the manner in which its daily working details are carried out in our native cavalry regiments, is essential to an appreciation of the practicability of the proposals, as, without this, numerous points which are in reality most simple and easy are certain to appear to present difficulties.

VIII.—SUMMARY OF THE PROPOSALS.

94. These proposals would achieve the following results:—

(1) An invaluable gain in the efficiency of the transport; falling under the heads of, and resulting from the combined effects of, (i) a personal commander; (ii) a simple system; (iii) the animal the man's own property.

(2) A large increase to the peace transport, for the same expenditure as at present.

(3) A regular system, without any increase of expenditure, for war expansion from peace nuclei. The expansion being to a total of—

84 mule troops, 40,824 mules.

25 light cart troops, 5,025 carts and 11,100 mules.

63 camel troops, 30,429 camels.

42 heavy cart troops, 8,442 carts and 18,648 bullocks.

8 pack bullock troops, 3,888 pack bullocks.

(4) The repayment to Government of the whole value of the present transport, assumed at 38 lakhs, and repaid at about $7\frac{1}{4}$ lakhs a year.

(5) The avoiding having to provide any money in future for the purchase of transport when additional transport is raised, either in war or at any other time.

(6) A reduction in the number of followers on service.

They would also cause a reduction in the Commissariat-Transport Department of from 11 to 20 officers (out of 140), and of 38 warrant and non-commissioned officers, and a number of office establishments. Of course all would be gradually absorbed, loss to individuals being avoided. And though reductions in departmental establishments are never agreeable to the department concerned, yet to the public service at large it is another matter; while at a time of so much financial pressure, when every one who can show how Government can be saved money is bound to do so, proposals which will give such large savings together with such increased war power, may, it is hoped, although involving such reductions, be pardoned even by the department concerned.

95. Lastly, be it remembered that transport means mobility; that the army with the best transport will have the greatest mobility; and that the army which has the greatest mobility wins in all the domain of strategy.

TABLE A.

Composition of Camel Troop (483 camels).

Detail.		Camels.	Drivers.	Dufadars.	Salutries.	Writers.	Native officer.
SECTION . . .	Carrying baggage, stores, etc. . . .	10	4*				
	Baggage camel of the section . . .	1		...	...	...	...
	Spare camel	1					
	Total . . .	12	4	...	...	...	...
SUBDIVISION (8 sections).	Carrying baggage, stores, etc. . . .	80	32				
	Baggage camels of the subdivision . . .	8		1	...	...	...
	Spare camels	8					
	Spare drivers . . . . .	...	3	...	...	...	...
	Total . . .	96	35	1	...	...	...
TROOP (5 subdivisions).	Carrying baggage, stores, etc. . . .	400	160				
	Baggage camels of the troop	40		5	...	...	...
	Spare camels	40					
	Spare drivers . . . . .	...	15	...	...	...	...
	Head-quarters of the troop . . . .	...	...	...	1	2	1
	Camels.						
	For officer commanding the troop	1	3	1	...	...	...
	For writers and office	1					
	For salutri and medicines	1					
	Head-quarters spare camel	1					
	Spare driver attached to head-quarters . . . .	...	1	...	...	...	...
	Total . . .	483	177	5	1	2	1

* One is tokedar.

TABLE B.

Composition of Light Cart Troop (201 carts and 444 mules).

Detail.		Light carts.	Mules.	Drivers.	Saddlers.	Duffadars.	Farriers.	Salutries.	Writers.	Native officer.
SECTION . . .	Carrying baggage, stores, etc. . .	10	20	16*	...	...	...	...	...	...
	Spare mules . . . . .	...	2	1	...	...	...	...	...	...
	Spare driver . . . . .	...	...	1	...	...	...	...	...	...
	Total†	10	22	12	...	...	...	...	...	...
SUBDIVISION (4 sections).	Carrying baggage, stores, etc. . .	40	80	40	1	1	...	...	...	...
	Spare mules . . . . .	...	8	4						
	Spare drivers . . . . .	...	...	4						
	Total	40	88	48	1	1	...	...	...	...
TROOP (5 subdivisions).	Carrying baggage, stores, etc. . .	200	400	200	5	5	...	...	...	...
	Spare mules . . . . .	...	40	20						
	Spare drivers . . . . .	...	...	20						
	Head-quarters of the troop . . .	...	...	...	...	...	2	1	2	1
	For officer commanding the troop.	1	2	1	...	...	...	...	...	...
	For writers and office									
	For salutrie, farriers, and medicines.									
	Spare mules attached to head-quarters . . . . .	...	2	1	...	...	...	...	...	...
	Spare drivers attached to head-quarters . . . . .	...	...	2	...	...	...	...	...	...
	Total	201	444	244	5	5	2	1	2	1

* One is tokedar.

† Nothing extra needed for baggage of the section, each man carrying his own on his cart.

TABLE D.
Draught Mules.

COST OF 201 LIGHT CARTS AND 444 MULES UNDER PRESENT ARRANGEMENTS. (NUMBERS AND RATES AS FURNISHED BY COMMISSARIAT-TRANSPORT DEPARTMENT.)					COST OF 201 LIGHT CARTS AND 444 MULES UNDER PROPOSED ARRANGEMENTS. (SILLADAR LIGHT CART TROOP.)						
Detail.		Num- ber for 50 201 carts and 100 444 mules.	Rate per annum.	Amount.	Total per annum.	Detail.		Num- ber.	Rate per annum.	Amount.	Total per annum.
			Rs. A. P.	Rs. A. P.	Rs. A. P.				Rs. A. P.	Rs. A. P.	Rs. A. P.
(1)	Jemadars, @ Rs. 12 .	1	144 0 0	576 0 0	1,536 0 0	(1)	Native officer, Staff pay Rs. 80 .	1	960 0 0	960 0 0	2,460 0 0
(2)	Duffadars, @ Rs. 10 .	2	120 0 0	960 0 0		(2)	Duffadars, Staff pay Rs. 25 .	5	300 0 0	1,500 0 0	
(3)	Drivers, @ Rs. 7 .	244	84 0 0	10,496 0 0	87,452 0 0	(3)	402 Silladar draught mules, @ Rs. 16 per mensem, 42 ditto, spare, @ Rs. 13-8-0 (with 244 drivers, including 22 spare).	402	102 0 0	77,184 0 0	83,988 0 0
(4)	Carpenters, @ Rs. 10 .	25	120 0 0	300 0 0							
(5)	Blacksmiths, @ Rs. 12 .	4	175 0 0	216 0 0							
(6)	Hammern, @ Rs. 7 .	4	175 0 0	126 0 0							
(7)	Bellowsmen, @ Rs. 6 .	4	175 0 0	108 0 0							
(8)	Peons, @ Rs. 6 .	4	175 0 0	108 0 0							
(9)	Weighmen, @ Rs. 5 .	4	175 0 0	90 0 0							
(10)	Gomashias, @ Rs. 40 .	2	480 0 0	480 0 0							
(11)	Clothing of mule attendants .	58	8 0 0	2,048 0 0							
(12)	Clothing of others .	6	4 4 0	102 0 0							
(13)	Hutting of attendants .	64	280 0 0	1,680 0 0							
(14)	Batta for attendants .	64	280 0 0	1,680 0 0							
(15)	Feed of mules .	100	444 0 0	85 9 6							
(16)	Replacement of castings .	8	35 5 0	160 0 0							
(17)	Replacement of gear .	10	44 4 0	54 8 0							
(18)	Repairs of gear .	90	399 6 0	1,999 0 0							
(19)	Replacement of carts and draught gear .	5	20 17 4	3,483 0 0							
(20)	Repairs of carts .	45	8 10 0	1,561 2 0							
(21)	Contingencies and medicines .	100	444 0 0	1,332 0 0							
(22)	Interest on cost price of mules .	100	444 0 0	3,996 0 0							
(23)	Interest on cost price of carts .	50	20 10 5	2,072 13 0							
(24)	Interest on cost price of gear .	100	2 11 8	1,211 1 0							
(25)	Salutries, @ Rs. 30 .	6	360 0 0	900 0 0	(25)	Salutri, @ Rs. 35 .	1	480 0 0	420 0 0		
(26)	Farriers, @ Rs. 15 .	1	4 180 0 0	720 0 0	(26)	Farriers, @ Rs. 18 .	2	216 0 0	432 0 0		
(27)	Saddlers, @ Rs. 10 .	2	120 0 0	960 0 0	(27)	Saddlers, @ Rs. 12 .	5	144 0 0	720 0 0		
Total followers 280 .					2,580 0 0	(28)	Sowar writers, Staff pay Rs. 15 .	2	180 0 0	360 0 0	1,932 0 0
Total cost of 201 carts and 444 mules } under present arrangements.						Total cost of 201 carts and 444 mules } under the proposed arrangements.					
Total followers 280 .					Rs. 91,568 0 0	Total followers 259 .					Rs. 83,380 0 0

106 IMPROVEMENT OF PRESENT ORGANISATION OF TRANSPORT.

TABLE E.

Cost of Camel Troop (483 camels).

Detail.	Rate per annum.	Total per annum.
	Rs. A. P.	Rs. A. P.
1 Native officer, Staff pay Rs. 80	960 0 0	960 0 0
5 Duffadars, Staff pay Rs. 25	300 0 0	1,500 0 0
483 Silladar camels, at an average of Rs. 90* per annum (with 177 drivers, including 16 spare).	90 0 0	43,470 0 0
1 Salutri, at Rs. 20	240 0 0	240 0 0
2 Sowar writers, Staff pay Rs. 15	180 0 0	360 0 0
Total cost of camel troop, Rs.		46,530 0 0

* See paragraph 38.

TABLE F.

Cost of Mule Cadre-Subdivision (96 mules).

Detail.	Rate per annum.	Total per annum.
	Rs. A. P.	Rs. A. P.
1 Duffadar, Staff pay Rs. 25	300 0 0	300 0 0
96 Silladar mules, at Rs. 13-8-0 (with 35 drivers, including 3 spare).	162 0 0	15,552 0 0
1 Saddler, at Rs. 12	144 0 0	144 0 0
2 Sowar writers, Staff pay Rs. 15	180 0 0	360 0 0
Total cost of mule cadre-subdivision, Rs.		16,356 0 0

TABLE G.

Cost of Camel Cadre-Subdivision (96 camels).

Detail,	Rate per annum.	Total per annum.
	Rs. A. P.	Rs. A. P.
1 Duffadar, Staff pay Rs. 25	300 0 0	300 0 0
96 Silladar camels, at an average of Rs. 90* per annum (with 35 drivers, including 3 spare).	90 0 0	8,640 0 0
2 Sowar writers, Staff pay Rs. 15	180 0 0	360 0 0
Total cost of camel cadre-subdivision, Rs.		9,300 0 0

* See paragraph 38.

OCCASIONAL PAPERS.

SOME NOTES ON THE SOLDIER'S SIGHT.

BY SURGEON-MAJOR B. M. SKINNER, A.M.S.

It is evident, since the introduction of a rifle sighted up to over 3,000 yards, that such a weapon can be of use only so far as the vision of the soldier enables him to apply that sight. The present test for the fighting recruit is that he be able to see a three-foot target at 600 yards, which means that a man who has a quarter of normal vision can now pass as a recruit into any fighting branch of the service; it also means that if his vision is only sufficient to enable him to pass the test, he would hardly be able to see a man at 400 yards.

There are many soldiers at present serving to whom the Lee-Metford rifle is of no use over 400 yards' range.

The result of the introduction of long range weapons is that the eyesight of the infantry soldier becomes a matter of primary importance, of much more importance than the question of his size (within limits). The question of efficiency on the battle field will not rest with men like Frederick the Great's grenadiers (shortsighted Germans), but with the men who can see farthest and clearest.

At the same time there are many branches of the Service to which a high condition of vision is not an absolute necessity; as for instance drivers of Royal Artillery, the Army Service Corps, Medical Staff Corps, etc., some of whom are already enlisted with only one-eighth visual powers.

It appears to the writer practicable to raise the standard of vision for infantry, without losing recruits who are up to the present standard of vision, who could be passed into the corps noted above. The infantry soldier should be able at the very least to see a man at 1,000 yards, which result could approximately be obtained by raising the standard to half normal vision, *i.e.*, ability to count the test dots at 20 feet instead of at 10 as at present. Men who enlist at this standard should not be allowed to transfer to departments unless they are bad shots, or their eyesight subsequently fails. It would appear that men with lower vision than this would be of but little value on the battle field until they came within 400 yards of an enemy, and they might, perhaps with advantage, be left behind when their regiments proceed on active service, or be told off as stretcher bearers; at any rate, care should be taken that no soldier with good vision (above half) should be anywhere but in the fighting ranks of his corps.

THE VENTILATION OF TENTS.

BY LIEUTENANT C. DE W. CROOKSHANK, R.E.

It seems a great pity that with the excellent tents which are made in India, both for Government and for private sale, so little is done in the way of ventilation.

The E. P. tent is very noticeable in this respect and seems to require the attention of the authorities owing to the great extent to which it is used for standing camps and marches in the hot weather.

A through current of air effected by openings in the top of the corner fly would go far to reduce the temperature when the tents are kept open, and to allow the foul air to escape which is generated in closed up tents crowded as they usually must be. The air escaping by this means must also be carried away through the outer fly in a similar manner; both flies being ventilated on some system which will not reduce the cover afforded against sunshine or rain.

The accompanying diagrams illustrate a simple and effective means to an end of which the attainment is probably not original in theory, though it is certainly seldom arrived at in practice.

Fig. (1) shows the outer fly fitted on each side of the ridge with similar ventilation holes to English Bell tents. Fig. (2) shows the inner fly fitted with a large covered aperture closed with "newar" lattice or "cotton net" marked BDD, the size of which might be advantageously 1 foot by 6 inches or more, and stiffened with galvanized wire. This can be easily raised or lowered from the inside by the strings ABC, fixed at B and running loosely through the inner fly in brass eyelets at AC, and fitted at their ends with the usual tent toggles and loops, so adjusted that by joining up the ends A on the inside, the ends C would join and the covered opening be pitched; and that conversely by joining the ends C, the ends A having been parted, the cover would lie back flat for striking purposes.

It will be seen from Figs. (1), (2), and (3) that protection from sun and rain is in no way sacrificed.

THE NEW SWISS INFANTRY EQUIPMENT.

The following are the main points regarding the new infantry equipment, as sanctioned by Parliament on 1st July 1896:—

- (a) The soldier is not to carry more than 27 kilos. (59½ lbs.), including his uniform.
- (b) This will include only one portion of his necessaries.
- (c) Besides the breeches worn, a light extra pair weighing not more than 600 grammes (about 18 ozs.) is to be included in the above total weight.
- (d) *Boots*.—One ordinary regulation pair, and one pair of light shoes not to weigh more than 500 grammes (about 1 lb.).
- (e) Amount of ammunition to be carried by each man is increased to 120 rounds, of which 90 are supplied on mobilization.
- (f) Weight of intrenching tools remains the same as it was.
- (g) No tent equipage to be carried by the soldier.

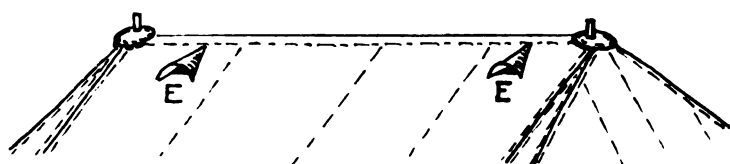


Fig. 1
Outer Fly

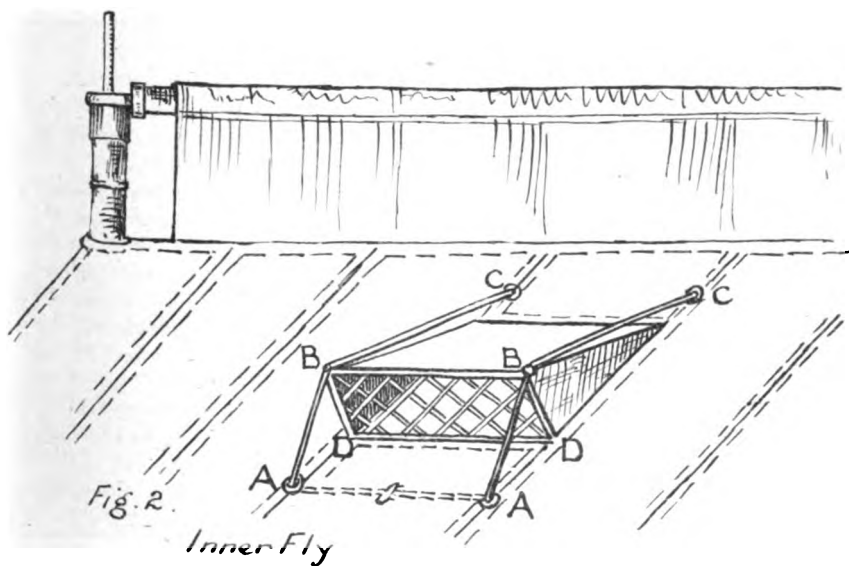


Fig. 2.

Inner Fly

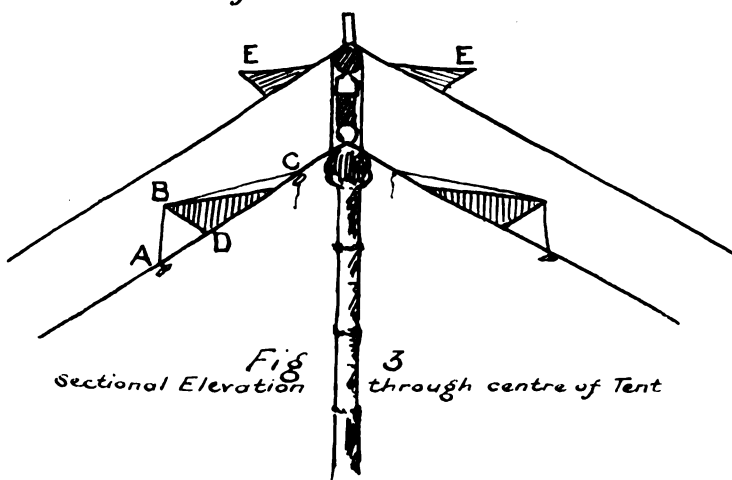


Fig
Sectional Elevation

3
through centre of Tent

These points were decided by a committee which has been engaged in discussing the question since 1890; at first under the direction of Colonel Feist, and afterwards on his death, under the direction of his successor, Colonel Rudolf.

This committee at first decided on retaining the knapsack.

They further decided that the equipment should be divided into three main portions, *vis.* :—

- (a) The belt with bayonet frog and ammunition pouches.
- (b) The havresack with water bottle.
- (c) The knapsack with a lower compartment to hold two ammunition packets, and to be fixed to the havresack, so that both can be taken off and put on in one motion.

Ammunition.—Six packets of six rounds each are carried in the belt pouches, two packets in the knapsack cover, thirty single rounds in cartridge belts. In action these belts are pulled round and hooked on to the havresack or breast buttons of the coat, so that the soldier has an ample supply of magazines or single rounds ready at hand.

The knapsack is long and narrow, and rests on two pads or the loins. Between these two pads there is a hollow space. The belt is passed through the straps of the knapsack. The weight on the shoulders and loins is lightened or increased and *vice versa*, accordingly as the belt is tightened or loosened, and thus various portions of the body can be eased at will. There are also straps which are crossed over the breast.

All the leather is of natural colour; the knapsack has a black fur (skin) cover, the fur being now supplied in the country itself.

The havresack is now made of canvas instead of ordinary ticking, and has a compartment to hold the water bottle.

The water bottle is made of enamelled steel, and cooking pots of aluminium.

The diminution of weight compared with the old equipment amounts to 3·5 to 4 kilos. (about 8 lbs.), but the cost is 10—11 francs more. The knapsack is, however, far more durable, the water bottle is unbreakable, and the cooking pots are made of expensive metal.

The Military Department are of opinion that still more will yet be done to decrease the weight at present carried by the soldier.

INTRENCHING TOOLS IN THE FRENCH ARMY.

An order has been issued by the War Office by which the intrenching tools carried by the infantry has been reduced by 4 pioches (pickaxes) and 24* hêches (spades) per company, except in the case of the Alpine Chasseurs.

* NOTE.—Forty-eight were formerly carried per company.

Each company will in future carry the following equipment:—

- | | |
|---|--------------------|
| 8 spades and 4 pickaxes . . . | for earthworks. |
| 3 axes (hacheportative) and 4 picks (pics à tête) and 1 saw* (scie articulée) | } for demolitions. |
| 13 hand axes (hachettes de campement) | |
- general use.

Thus each corporal's command has at least two tools available.

Each company is also to be provided with a machine (pattern not yet settled) for cutting wire, destroying telegraph lines and obstacles. These are termed *cisailles à main*.

SUPPLY OF AMMUNITION IN THE FIELD IN THE FRENCH ARMY.

With the introduction of magazine rifles, the supply of ammunition in the field, and more especially during an action, is of greater importance than formerly, and calls for more special attention as regards the many questions that are included under this heading.

The new French Field Service Regulations of 28th May 1895 contain the most interesting instruction on this particular point (*vide* Arts. 89—94, Chap. VII).

To commence with, the greatest stress is laid upon the importance of commanders of every grade being responsible for the supply of ammunition in the field as required.

In action ammunition is invariably brought up and passed on by all columns from rear to front.

The ammunition for the army is divided into three main divisions or sections—

(a) Ammunition for the fighting line comprising—

For the Infantry.—(1) That carried by the men, and in the company ammunition carts which accompany them; (2) that carried by the infantry ammunition columns.

For Artillery.—(1) Ammunition in the wagons and limbers; (2) that carried by the artillery columns.

For Cavalry, Engineers, and Departmental Army Corps troops.—(1) Ammunition carried by the men; (2) that carried by the infantry column.

(b) Army Corps Park ammunition.

(c) Army or Main Park ammunition.

Although the infantry and artillery columns are attached to some particular infantry division or artillery corps, they are responsible in action, and, in cases of emergency, for the supply of any body of troops in the vicinity.

It is also left to the discretion of the Army Corps Park Director to carry out requisitions made by any corps not belonging to his army corps.

Supply of Ammunition to Infantry in the fighting line.

In camp and on the march pouched ammunition is replaced from that of sick and absent men, etc., and the company ammunition

* NOTE.—Rolled up in a case when not in use.

carts are only to be requisitioned when the above supplies are insufficient. The carts are in their turn to fill up as soon as possible from the ammunition columns. During an action pouch ammunition is immediately replaced from the ammunition carts, and whenever a big engagement commences or even before marching off, the ammunition in the carts is got ready for distribution. The carts are not filled up from the ammunition columns during the action. When the ammunition carts are empty, pouch ammunition is replaced either by that taken from dead and wounded men or from the balance brought by the carts of the ammunition columns.

The ammunition carts are brought up to the points where the detachments with the company ammunition carts are concentrated, and from thence up to the firing line or the vicinity, as ordered by the officer commanding.

No men or carts are allowed to go back for ammunition during the action. This order applies not only to the troops actually engaged but to the detachments with the company ammunition carts and ammunition columns.

Supply of Artillery Ammunition in the fighting line.

In action, the artillery ammunition is divided into two groups: (1) group of fighting batteries, comprising the guns and a portion of the ammunition carts of each battery; (2) group of fighting columns, comprising the remainder of the battery ammunition wagons.

Ammunition is supplied direct by the wagons of each battery, firing being relieved by its "fighting column."

The latter replace their supplies from the ammunition columns.

When a "fighting column" is taking up its wagons to a battery, the commander of the group calls up a similar number from the ammunition column. As soon as the latter reach the "fighting column," ammunition is replaced by unloading and not by relieving the wagons.

It is left to the discretion of General Officers to dispense with these rules in cases of emergency.

Special arrangements for Cavalry and other branches of the Service.

All troops except the above are supplied with pouch ammunition, chiefly from the infantry ammunition columns, but occasionally also from the Park columns.

Cavalry divisions may be supplied from each army corps in the same manner as the actual troops composing the army corps.

Arrangements after an engagement.

After an action, the company ammunition carts are filled up from the carts of the ammunition columns.

Any surplus of pouch ammunition is taken from the men and replaced in the boxes in the carts.

Supply of Ammunition in rear of the fighting line by Army Corps and Main Parks.

The Army Corps Park consists of four divisions with artillery and infantry ammunition, which supply the requirements of ammunition columns.

It is under the orders of the artillery commander with the army corps.

As a rule, ammunition columns are not refilled from the Army Corps Park until after the engagement. In case of need, however, the Park may be brought up before the end of the action or even right up to the batteries on the field.

The main artillery or army Park is quite in rear of the army. It carries ammunition in white boxes, intended for the supply of the Army Corps Park.

It is composed principally of one main Park division for each army corps of an army, and also includes a main Park reserve for maintenance of material and various special supplies.

The main Park is usually divided into five columns which are distributed along the railway lines. The first column is accompanied by a transport train which takes their ammunition.

The supply of ammunition from the main Park is carried out by the above transport train or by impressed carts or by rail.

TRANSLATED BY P. H.

from the "Militär Wochenblatt."

EMPLOYMENT OF PIGEON POSTS.

The Italians have lately been carrying out several experiments with a view to connecting Sardinia with the continent by means of a pigeon post. One experiment was made between Rome and La Maddalena, a distance of 270 kilometres (167½ miles). Four to six pigeons were sent off each time, two-thirds of which reached Rome from La Maddalena, and two-fifths of those sent from La Maddalena to Rome. The time occupied by the journey was between 4 hours 50 minutes and 8 hours 18 minutes. The average rate of flight being 45 kilometres (28 miles) per hour.

This experiment proved that the pigeon does not apparently direct its flight by seeing the place to which it is to go. To see the island of La Maddalena from Rome one would have to be 5,000 metres (16,400 feet) in the air. The pigeons never rise more than 4,000 metres (13,120 feet), and at this height the island can only look like a speck on the water.*

Another experiment was made between Lagliari and Naples, the 450 kilometres (279 miles) being traversed in nine hours.

On the other hand, we note that, during experiments made between England and the United States, out of nine pigeons taken on boardship from Boston to London, and released three months later, three crossed the ocean, one reached Boston direct, one was found in New York, and the third in the Alleghanys.

TRANSLATED BY P. H.

from the "Heeres-Zeitung."

* NOTE.—The argument here seems obscure. The island is supposed to be invisible at 4,000 metres. Perhaps the writer intends to imply that if it were visible it would be but a speck in the distance.—ED.

SOME NOTABLE NEW PUBLICATIONS.

"Travels in the East of Nicholas II, Emperor of Russia, 1890-91,"
by Prince Ukhtomsky. Translated by Robert Goodlet. Edited
by Sir George Birdwood, K.C.I.E. (A. Constable & Co.)

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The essential qualities of the book have been admirably brought out in a critique in "*The Pioneer*." "*The Times of India*" too has noticed the book in a leading article with perhaps a somewhat wider sympathy. From these two articles we gather that the leading characteristic of the book is the intense egoism of the writer, but that the egoism is so apparent and naïve that it detracts but little from the intrinsic interest of the book.

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at 4s. *net* each, or in four volumes @ each (Macmillan &
Co.) 24 0

Part I and Volume I are already issued.

"England, Egypt, and the Soudan," by Major Wingate, D.S.O.,
R.A., and Major Marriott, D.S.O., R.M.A. (Macmillan & Co.) ...

This is announced to appear shortly. We fear the announcement is premature and that the publication of this book, which would be of great interest at the present moment, may be indefinitely postponed.

A book by F. C. Selons is to be published shortly, dealing with the events before and during the revolution in Matabelerland. This should be a book of more than usual interest.

s. d.

"Battles and Battle-fields of England," by C. R. B. Barrett (A.
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Mr. Barrett gives a full account of every important battle which has been fought in England from Stamford Bridge to Sedgemoor. He has not contented himself with descriptions by other writers, but has visited every battle-field himself. The book is copiously illustrated.

s. d.

"A History of the Coldstream Guards, 1815 to 1885," by Lieutenant-
Colonel Ross of Bladensburg, C.B. (late Coldstream Guards)
(A. D. Innes & Co.) 42 0

The author has dealt comprehensively with the military events of these fifty years; the occupation of Paris and the French fortresses, 1815—1818, the troubles in Canada, the Crimean War, the Egyptian Campaigns, in all of which the Coldstreams had part. The volume is, therefore, something more than a mere regimental record.

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JUNGLE WARFARE.

BY MAJOR R. M. RAINEY, 12TH REGIMENT (2ND BURMA
BATTALION), MADRAS INFANTRY.

Infantry Drill, 1893, gives about one page to *Savage Warfare*, and deals only with savages who fight in the open.

Under the term "*Savage Warfare*" may be included wars with all races or tribes who do not fight on the lines of Europeans. Our army is constantly engaged in little wars of this nature in all parts of the world. We have officers experienced in the tactics and wiles of the different races they have fought with. Unfortunately the experience gained in wars with one type of savage may be of little use to an officer employed against a different class of savage. Under these circumstances it seems a pity that officers are not invited to put in writing, for the benefit of others, their experiences and the opinions formed by them as to the best means of conducting warfare in the particular country where they have had the good fortune to see service.

Having been fortunate enough myself to have seen some jungle work in Burma and the neighbouring hills, I now venture to jot down a few notes, hoping that they may be some little help to others, and trusting that other officers who have wider experience may be induced to give their views and experiences. I do not for an instant pretend that all the ideas are original. Some are wrinkles picked up from others—some perhaps from books; but I can conscientiously say that there

is no statement made which I have not seen exemplified with my own eyes. I do not claim that the opinions I have formed are correct or that my views on any point are the best.

It may be taken for granted that the inhabitants of a country densely covered with jungle will not for choice fight in the open or in close formations.

Shock tactics will chiefly be reserved by them for night attacks, surprises, and may occasionally be resorted to when they consider themselves comparatively very strong.

As a rule they will not fight in the open nor in dense formations, but will confine themselves to bush fighting or to occupying strong and partially concealed defensive positions. They may be expected always to have pre-arranged a good line of retreat. Under these circumstances the troops must follow them into the jungles and meet them on their own terms. In jungle fighting an attack may come from any direction and sometimes from every direction at the same time. Also very little warning need be expected, most attacks being more or less in the nature of a surprise. The difficulty of keeping touch and the limitation of vision necessitates all distances being much reduced between the different units engaged.

The necessity for making use of advanced, rear, and flank guards is greater even than elsewhere, but they require to be modified to suit the altered conditions of jungle warfare. Ordinary flank guards are often unable to keep up, and they cannot prevent small parties of the enemy lying concealed near the path which the main body must follow, harassing it and often inflicting considerable loss and annoyance. To prevent this, columns on the march should protect their flanks by flankers working in pairs. Sometimes owing to the density of the jungle it may become absolutely necessary to dispense even with these flankers, as their slow progress would so delay the march of the column that its destination could not be reached in time. In such a case there is no alternative but to chance it, keeping a sharp look-out and moving as rapidly as possible through the locality. Of course the flankers would move out again the moment it became possible for them to work.

The distance these scouts or flankers should maintain from the main body cannot be laid down exactly. They should not in dense jungle be beyond calling distance, and it is a good plan to keep touch with them by a preconcerted signal, such as imitating the call of a bird or by whistle.

Troops usually have to march in single file, and consequently the column is terribly straggled out.

The simplest way to work the flankers is to make each company commander responsible for the protection of the flanks of his company, whether on the march or when halted, and also for keeping touch with his flankers by constantly repeated sound signals, a non-commissioned officer or a special man with the company being detailed for this duty. Special care is required at a change of direction of the path that the flankers do not stray, also that they are not left behind when the column moves on after a halt.

The same precautions are necessary during a temporary halt, even more necessary than when on the move, and in those cases when, while moving, flankers have had to be dispensed with owing to the denseness of jungle, they should invariably be detached at every halt, no matter how brief. A column moves like a long serpent winding through the jungle and is in the very worst possible formation for fighting. It can hardly ever be safe for any firing to take place, as on a winding path you may shoot as many friends as foes. I have actually on several occasions seen this accident occur.

Large advanced guards are not necessary in jungle. On a narrow path a few men are as good as a great many. The enemy themselves must move with an equally small front. The men of an advanced guard must be clearly made to understand that in the event of their meeting the enemy they must stand their ground to give the troops behind time to get into a fighting formation.

A good formation for an advanced guard is to send on a couple of files as "point," and to detach a file or two to either flank moving parallel to, within whistle sound and somewhat in advance of "point," the three groups moving as it were in the form of a half moon of which the flank groups are the horns. In this way ambuscading parties of the enemy waiting for "point," who advances along the path and is the usual object of their attention, are outflanked and either fire prematurely or are obliged to sneak off when they hear the flankers threatening their line of retreat. Flankers themselves will be most frequently fired at when crossing open patches. These should, if the enemy is very aggressive, be crossed at the double.

Ambuscades and surprises are the speciality of a jungle people. The former are often arranged near a path, and, as I have just said, "point" of the advanced guard is a frequent victim. For this duty and for flankers men should be specially selected, keen, fearless men, with good ears and eyes, sportsmen and *shikaris*, if possible. The leading man of "point"

and sometimes the leading flankers may be loaded. Bayonets should be fixed. There is no use firing at an ambuscade unless loaded at the time he fires at you. The enemy fires and then generally bolts. But if he is never fired at he may become unpleasantly bold, and ambuscades, if the ground favours, may be expected all along the march. Besides, a quick shot may occasionally pick off one of the ambuscaders. A sportsman following up a wounded animal on foot and expecting it to charge or break at any moment would, under such circumstances, carry his rifle loaded. Great care must, however, be used in firing to avoid any chance of hitting a comrade, and it must be delivered on the instant. It is waste of ammunition firing afterwards.

The advanced party of the advanced guard should follow "point" within whistle sound, and should move with fixed bayonets, ready to rush up on the slightest emergency to support "point," and together with "point" to charge the spot from which the ambuscade has fired. They must never fire without seeing the enemy. Never give him time to re-load. He uses muzzle-loaders as a rule. Make a rush at him whenever you see him. It is hopeless and interminable work taking cover and stalking him. He is much better than our men at that kind of game. You can always tell his whereabouts (except he is a bow and arrow man) by the smoke which hangs in the jungle. Beware of being decoyed into a further trap or ambuscade. A favourite position for arranging an ambuscade is at the bend of a path when a clear view for some twenty to forty paces is secured. A dip in the ground or a nullah affords the ambuscaders a secure line of retreat. Ambuscades are sometimes arranged within a few paces of the path, so flanking files should not work too far out. Sometimes the head of a column is fired on, sometimes, especially when the scouting is slack, the column is allowed to pass unmolested, and the baggage or the rear guard is the object selected.

To guard against surprises, never neglect at every halt to post look-out men all round, and place them or rather teach them to select for themselves a good spot, from which, while themselves concealed, they can best see, not distant objects, but all round them, and in hills the slopes directly at their feet. At night, groups, if possible on every path with sentries well concealed, acting as ambuscades, can best secure a quiet night for the camp. Strew prickly pear, thorns, etc., and stick in "pandjis" to prevent a sentry or group being rushed, and block any path for which a group

cannot be afforded. In hills occupy any point from which rocks or logs can be rolled into the camp, and clear a space below the camp in case the enemy attempts by setting fire to the grass to smoke you out. Keep followers *inside* the camp; if *outside* and there is an alarm, they will rush in for protection, when they run the risk of being bayoneted by mistake, and the enemy may rush in with them.

Thorns, prickly pear, abatis, etc., may often be used round a camp to prevent a rush. Men should, when possible, sleep so that when they are suddenly turned out they are facing their proper front. They should be told off for special places and sleep opposite them. Shelters should be rigged up whenever possible as a protection against wind and weather, but digging up the ground often causes fever, and should only be resorted to when the slope of the ground prevents the men getting proper rest: in that case each man must dig out a shelf to lie on.

When there is any chance of a surprise, men should sleep in their boots; and in all cases each man should sleep with his rifle.

In thick jungle individual fire must frequently supersede volleys. It seldom occurs that a whole section or indeed more than two or three men can see the enemy at the same time, and then, as a rule, it is only a snap shot that can be obtained. Of course use volleys when possible, but common sense will show when better results will be obtained by individual fire. Independent fire is not often suitable, as if it is ordered, some men will shoot who see nothing, and it wastes ammunition. For jungle work machine soldiers are useless. It is advisable with men new to the work to warn them to keep constantly noting objects, such as hills, the way streams run, and so on, and to impress on them how easy it is to get lost. If the four men of a section of fours work together as is laid down for mounted infantry, no single man should ever be lost, and three or four men, who stick together, show a bold front and husband their ammunition, have a fair chance of getting through all right even if they do get separated from their comrades.

Every man should carry a small cutting tool of some kind, such as a "kookri" or a "damah."

Supporting bodies must move close to the troops, in front of them, keeping within whistle sound if they cannot keep them in view.

Free use should be made of connecting files. Men should be particularly warned never to move far from the path for

purposes of nature, in search of water, or on any excuse whatever. They should always go in pairs.

Arms should never be piled during halts; each man should keep his rifle with him.

When in contact with the enemy, or when contact is expected, adopt a loose line and move very slowly. Shoulder-to-shoulder formations are impossible. Have a file of direction and warn men of each section of fours to keep touch. Impress the name of the next halting place on all ranks, its direction and distance. Point out any prominent landmark known to be near it.

Make use of a compass.

Small parties should always arrange beforehand a rallying point in case of dispersal. This is also very necessary if a pursuit is undertaken, especially in the case of mounted infantry or cavalry. It is extraordinary how easy it is in a pursuit to lose all touch with the others and one's own whereabouts. A prominent landmark must be pointed out as a rallying point.

As a rule, no stockade, pagoda, or any other position should be attacked without first carefully reconnoitring it. Hasty attacks on unknown positions have frequently resulted in failure, and are nearly always accompanied by heavy losses. Stockades, etc., can generally be turned, and, when this is possible, it should always be done in connection with the direct attack.

When a rush is ordered, it must be carried through with the greatest vigour.

On an open plain, to lay down such a maxim might seem superfluous, but in jungle fighting there is great temptation to take advantage of the cover which is so plentiful, and a faint-hearted man can, without detection, so easily do so that I wish to lay stress on this point.

Every attack on an enemy in position should consider cutting off his line of retreat. For this mounted infantry are invaluable. Always try to arrange that he must break across an open bit.

In combined attacks on positions, special care must be taken that one body of troops does not come under the fire of another party approaching from a different direction.

If you find yourself unexpectedly on the top of a stockade, pagoda, etc., or in an ambushade, it is often better, no matter how small your party, to risk a charge than to attempt to withdraw. A retirement is taken as an indication of fear, and the enemy

will become proportionately bold and aggressive and harass you all the way back.

A word of warning to young officers is—do not, as has often been done, accompany point of the advanced guard. There are seldom with a small column more than one or two officers, and the whole work is often nullified if the commander is put "*hors de combat*." To be "bagged" while still on the march is worse than useless. There may be lots of leading and real fighting to do later on, and there is really no fun or excitement in being sniped on the march from behind a bush. I go further and recommend that no officer marching through jungle should march as leading man of any party, whether there be scouts or an advanced guard on a head or not. Ambuscades lie so close to a path that if officers make themselves conspicuous they are pretty sure to be bagged; and, as I said before, when there are only one or two with a column, the loss of an officer before real work has begun cripples the show, if it does not utterly ruin it. I insert this warning because I have frequently known officers doing their best to be shot with the idea of being up and seeing whatever there may be to see. I am quite sure it is not "playing the game." Also remember that in an attack or pursuit it is not sound to run or ride away from your men. An officer carries comparatively little weight and should be able to outpace his men, and it is marvellous how easy it is in the jungle to get out of touch before you know where you are.

It is very unfair to the men to act in this way, for if an officer gets killed under these circumstances, doubts are sometimes entertained as to their behaviour, when in reality they may have behaved just as gallantly as the officer who has lost his life entirely through his own want of judgment. I say, take all necessary risks and lead the men when they want it; do not try individually to "make a name," which is selfish, but endeavour to get the best results by an intelligent and combined effort of the whole party. It is quite different to civilized warfare when there are lots of officers, and if one is down, there are others to replace him.

Explain the object fully, before beginning any undertaking, to all ranks; indicate the direction, name the objective, state distance, appoint a spot for rallying in case of necessity. Once the men get scattered in the jungle, it will be impossible to issue further orders.

If the enemy is met within the jungle, but not holding a position, especially if an encampment has been surprised,

"rush them" without a moment's hesitation. Leave a party to secure the effects left in the camp, but press after the enemy as he bolts and keep up the pursuit as long as possible. Mounted infantry are most useful in these cases, as foot soldiers are soon outpaced by the active, light-clothed native. It will be impossible to keep the men together, but the four men of each section of fours must keep touch and work together. The commander can do little more than fix a rallying point and trust to the men's intelligence to find their own way back. He should always keep a bugler and at least four men with him. I advocate leaving a special party to secure the effects left in camp, because on these occasions the temptation to the men, especially natives, to try to secure fowls, goats, and such like loot, instead of pressing on, is very great, and unless some system is arranged beforehand by which everything which it has been decided to confiscate is collected and then evenly distributed, the followers snap up everything and the soldiers get nothing. The same applies when taking a village.

Villages have sometimes to be surrounded at night. This is a difficult job and requires not only practice but great intelligence and discipline from the men. If possible, without causing suspicion, examine approaches by day. Note probable direction of retreat of the enemy, and if you suspect that he has sentries posted on the paths of approach, avoid them by creeping up a watercourse or nullah, if possible. Post groups on all paths, especially strong opposite the village gates. Extend men all round at some distance. Then at a previously arranged time advance noiselessly with fixed bayonets to about 100 yards from the village fence and lie down until daylight. No noise; talking and smoking strictly forbidden. Never fire, except at men who may try to break out, and then use buckshot for choice. Have special groups detailed to head off from the jungle any men who may succeed in breaking through. All should be in position at least an hour before daylight. If by chance the enemy is met in the open, mounted infantry have a great chance. Their action should always consider heading the enemy off from the jungle. It is impossible in the majority of cases to collect all the arms from men who pretend that they wish to surrender and to secure the men themselves. Shikoing* is a common ruse when a man finds he is hard pressed. If not watched, he will bolt into

* To "Shiko" is to grovel on the ground—the most humble and abject form of salutation a Burman can make.

the jungle the moment he has got his wind again and will be quite ready to oppose the troops next day. Their powers of coming up to the scratch time after time are marvellous.

Running away is no sign of demoralization ; it is part of their system. They have no ideas of honour or chivalry.

It is often necessary to establish defensive posts to be temporarily occupied during the operations of a column, either as strategical points for the storage of rations and stores, to keep open a road, etc.

The construction of these posts is a most important matter. The considerations as to the selection of the best site need not be gone into here. Of course, the object for which the post is being established would influence its location ; the details of water-supply, field of fire, and so on, would have to be dealt with ; but perhaps the two most important local points are that it should be difficult to rush it suddenly, and that as far as possible precautions to guard against fire should be taken.

A square or rectangular enclosure of thorns, or, better still, Chin bamboo stockading with prickly pear, "pandjis," and such like obstacles, is frequently adopted. At diagonal corners of the enclosure, two small bullet-proof block-houses or stockades, each one flanking two sides of the enclosure, will, while affording protection to the defenders and enabling one sentry to watch two faces, set free a portion of the garrison for reconnoitring, counter-attacks, and so on. It is of the utmost importance that a purely passive defence should not be resorted to. A small group in each block-house will suffice to protect the post and release the rest of the garrison for the important duties outside, and the more active they are in the way of patrols, counter-attacks, setting ambushes for the enemy, etc., the less they will be harassed and the better will the morale and spirits of the men remain.

The men will usually be in huts of an inflammable nature, and attempts to set fire to the place must be expected and guarded against. Tow soaked in kerosine oil, tied to an arrow, is sometimes set fire to and shot in with the object of causing a conflagration. To set a post on fire and, when all hands are engaged in trying to extinguish the flames, to rush it is a favourite dodge and often most successful. The guarding of prisoners in camp and in post is a great nuisance. In camp they should be handcuffed. When they have long hair, a thin rope plaited into it, as a Chinaman's pigtail, and the end tied to a tree or a peg out of his reach is a good plan. They

should not be allowed to cover their heads up. In semi-permanent posts stocks should always be made.

Baggage, stores, etc., usually follow a column with a separate escort, and practically may be treated as an ordinary convoy. It is sometimes advisable to halt the column and to wait until the transport get safely through a dangerous bit. Whenever an open bit is reached, the transport should be closed up and every effort should be made to prevent straggling. The same precautions in the way of advanced, rear and flank guards are of course necessary as with the column itself. The escort should not be frittered away in twos and threes along the line, but should move in parties with their own flankers and in charge of sections of the transport.

Troops moving through jungles will often lose their way. Rear guards and baggage guards occasionally find it quite impossible to tell which way the column has gone. As a guide to those following, trees should be freely blazed, wrong paths blocked, and paper when available used as in a paper chase.

Guides have often to be employed to lead troops to their destination. Their treatment deserves a few words. A guide should never be sent with "point" of an advanced guard, or exposed to any unnecessary danger. The commander of the advanced guard should keep the guide near him, and he should, whether friendly or not, be securely tied to a strong man. If this is not done and firing commences, there is a great chance of the guide bolting from fright and either being shot by accident or disappearing altogether, in which case, from want of knowledge of the jungle paths, the column may fail in its object or lose its way entirely. Guides sometimes intentionally lead a column into an ambushade; they frequently, though knowing well the whereabouts of the enemy, take the column the wrong way. This has often been attributed to their being on friendly terms with the enemy, but I believe it was more often done because the man was in mortal terror of being shot by the enemy if there was a fight, or that if he led the troops in the direction of the enemy and they suffered loss that he would be suspected of having led them into an ambushade.

Fair treatment and decent rewards will best secure good guiding.

Prisoners should on the march be securely tied together if there is more than one; if only one, he should be tied to a strong man. In a jungle country, cavalry on big horses are somewhat out of place. In Burma the excellent work done by the cavalry is well known, and in the more rideable districts

they were the terror of dacoits, but in the really heavily jungled parts and among the swamps and paddy fields, as also among the hills, there was little scope for them. It is extremely unlikely that among big jungles we shall ever meet an enemy mounted on big horses, and as a rule I think most people will admit that what mounted work is possible can be satisfactorily carried out by mounted infantry.

The moral effect of guns is very great, and there is no doubt that they are a most valuable adjunct to infantry in jungles and hills, saving much work and loss of life; but in order to bring savages to a proper state of complete submission, they must be well crushed and thoroughly worsted by infantry. Guns cannot be everywhere or go everywhere, and if they attribute their defeat solely to the guns, they are very likely to "play up," or break out again when there are no guns opposed to them, or when the guns are withdrawn.

Jungle fires sometimes block the way when moving through jungles and endanger the safety of camps and posts. Clearing a line a few feet broad will generally stop them. I have seen a ten-inch path completely stop a raging fire. Climbing trees is the worst chance of escape.

Native troops should wear boots, not shoes. The latter do not afford sufficient protection from thorns, "pandjis," etc., and these cause nasty sores, difficult to heal. In muddy ground, such as paddy fields, shoes are useless.

A small knowledge of surgery and medicine is most useful; every small party cannot have a doctor, and in jungle warfare small parties are the rule, not the exception.

A wounded man can be carried by two men in a puggie suspended to a pole or bamboo.

Arrows should not be wrenched out of a wound, or the head will probably separate from the shaft.

The secret of keeping good health is to do oneself as well as possible in the way of eating and drinking; take lots of exercise and use quinine.

SOME CONSIDERATIONS ON THE SUBJECT OF MUSKETRY FIRE AND MUSKETRY TRAINING.

BY GENERAL H. R. BROWNE.

Hardly any one who has given attention to the subject will be inclined to deny that the result of musketry fire is, when on actual service, disappointing.

Whatever the improvements have been—and they have been many and great—in arms, ammunition, and individual training, and however high the standard of shooting at targets and upon ranges may be, the practical effect in war, in view of the ratio of killed and wounded to the expenditure of ammunition, seems to be very much what it was fifty years ago.

That modern arms are capable of inflicting tremendous losses in comparatively short periods of time recent wars have certainly shown. But they have not shown that those losses indicated any great advance in accuracy or control and economy of fire. Statistics, if they could be obtained, would probably point to an opposite conclusion.

Human nature being what it is, extreme rapidity of fire is almost necessarily destructive of control and destructive of accuracy; the effect of such fire depending rather on its volume than its direction.

If this is admitted, a serious question arises, *i.e.*—Is there any advantage in great rapidity of fire or in the possession of arms constructed to deliver this high rate of fire?

And this may be followed by a second question—What is the maximum rate of fire that can be kept under control and delivered with reasonable accuracy by soldiers in the ranks?

As regards the first of these questions, the chief point urged by the advocates of magazine arms, which are of course associated with rapid fire, is that in moments of great urgency an overwhelming fire can be produced before which nothing can stand.

Theoretically the argument is sufficiently good; but if in practice the bulk of this fire is wild, unaimed, and uncontrolled, the theory has but little to recommend it. As to its annihilating properties, the history of recent wars hardly shows that it has ever possessed them.

It can hardly be doubted that more deliberate fire, under moderate control, would have greater effect.

"Moderate" control is a term used advisedly, for, under the circumstances of close and severe fire, control can never reach any higher degree than that of giving a fairly good general direction to fire and preventing useless waste of ammunition. If it attains those points, and they will only be attained by previous instruction and practice, all reasonable expectations will be fulfilled.

Excepting these occasions of urgency, or "supreme moments" as they are sometimes called, there can be no pretence for the necessity of extremely rapid fire or of any advantage that could accrue from it.

Steady, well directed fire, well under control, is under all circumstances the object above all others that it is desirable to attain. The nearer it is attained the greater must be the effect, and that will in all probability be a double effect, *i.e.*—"increased loss to an enemy: decreased loss on its own side." The converse is the case if fire, whether from excessive rapidity or other cause, is ill-directed and ill-controlled.

As to the second question, the rate of fire that can be maintained with fair accuracy by soldiers in the ranks and be at the same time under proper control is very much less than is generally assumed.

At a target, all things being favourable, from seven to nine rounds per minute may be fired from a single breech-loader and from 12 to 15 from a magazine rifle by an individual soldier in ordinary uniform. If the same man is in the ranks with others, the rate of his fire will be reduced. If he is in full marching order, the rate will be again reduced. If tired and fatigued by marching, by cold or heat, or any of the numerous causes that affect his normal condition, his rate of fire will be further reduced. All these causes are in constant operation in war, all tending to the same answer to the question, *viz.*, that the rate of fire that can be maintained to good purpose by soldiers in the ranks and in action is not very high; five to six rounds per minute from well-trained men is probably in excess, even under fairly favourable conditions; and if control is to be effective, it is certainly in excess.

Whether magazine arms or single loaders are used, matters little. Fire, to be well directed and well controlled, cannot exceed a certain rate, and that rate is not one of great rapidity.

Within the last few years increasing attention has been paid to the subject of control of fire, yet its importance is far

from being fully appreciated or understood, notwithstanding that it is the very essence of effective fire. "Control" is not altogether a sufficiently comprehensive word, for it is not enough that fire should be "kept in hand" commencing and ceasing when desired; it must also be closely superintended and directed. The expression may, however, be accepted as generally understood.

In order to be effective, "control" must be decentralised. The executive unit must be a small one, that is to say, that the actual ordering and superintending of fire must be confided to the commanders of small bodies of men. Probably the best executive units are the sections of companies; their commanders being the sergeants or corporals in charge; superintendence being carried on by the captains, aided by their subaltern officers; the regimental commander giving a general direction only.

If this principle is a sound one, it ought to be assiduously practised in peace, so that it may acquire the force of habit. The natural tendency is to feel that things done personally are better done than by deputy, and the difficulty is to learn to have confidence in the deputy. It seems a simple thing enough, but it is not an easy one in carrying on fire. The colonel must trust to his captains and the captains must trust to their commanders of sections. In no other way is real control possible in action.

At the same time it will not do to lay down "hard and fast rules," for, in the ever varying situations of war, occasions may readily be conceived in which it might be desirable that the captain of a company or even the commander of a regiment, should himself direct the fire of his men.

In the application of a general principle something must be left to the judgment and discretion of responsible officers.

There has been a good deal of controversy on the question of the relative merits of volley and independent firing; each, however, has its appropriate place.

In all firing lines, that is to say, lines of soldiers in loose and extended order, whether skirmishing or attacking some fixed position, the fire must, almost of necessity, be independent,—in other words maintained by soldiers individually, though still superintended by the company officers and non-commissioned officers.

And it is again almost a necessity that fire at short ranges should be independent; for as distance lessens and fire becomes more severe and intense, so the power of steady

control, indispensable to volleys, also lessens until it pretty nearly vanishes : theoretically it should exist unchanged to the last ; practically it never can.

Steady firing in volleys will no doubt produce the best results for all purposes during action so long as the distance and intensity of opposing fire admits of effective control, clear observation, and collected orders.

Small detachments may, even under the most pressing circumstances, be able to maintain this control till a very late moment. But that cannot be expected when large numbers of troops are seriously engaged.

The question is, at what point will it usually be advisable to change from volleys to independent firing? In all probability the best answer is that the change should be made as soon as the distance is reached at which no alteration of sighting is necessary, *i.e.*, between 200 and 300 yards according to circumstances.

A subject closely connected with effective rifle fire is the eyesight of the soldiers in the ranks. A large percentage of our men undoubtedly suffer from defective vision, the causes of which are explained in a very able paper by Surgeon-Major H. R. Whitehead, published in the "Journal of the Royal United Service Institution" early in 1896; attention being again called to the subject by Surgeon-Major B. M. Skinner in the "Journal of the United Service Institution of India" in January of the present year. The fact therefore rests upon the evidence of medical officers of standing and experience.

Up to recent years it was not perhaps of any great consequence ; but now that accurate weapons of great range and some delicacy are placed in the hands of our soldiers, it becomes a question of importance requiring to be dealt with.

No army can afford to reject as recruits all those whose vision has imperfections, or to discharge such men from its service ; neither would it be desirable to do so ; for shooting is, after all, only one of many qualifications that go to make the rank and file of regiments what they are and have been, as the pages of history will tell.

Many gallant and good soldiers may, from causes that cannot be remedied, be indifferent shots, yet their courage and steadiness and example may be of the highest value.

They cannot be spared. Something, however, might be done in regimental organisation so as to secure the best attainable results from the arms of the present day.

Special companies might be formed on the principle of the "old flank companies," composed of men of ascertained thoroughly good sight, both by day and by night, with a view to their employment in war on such duties as could not safely be entrusted to soldiers whose sight is imperfect.

In times of peace, a classification should, in any case, be made and carefully kept up and revised in every corps, if only as a matter of justice to the exertions of officers to train their men and the endeavours of the men themselves to profit by that training.

It is probable that considerable numbers of our rank and file are incapable of attaining more than very moderate proficiency with the rifle, and neither they nor their instructors are in any way to blame for it.

The subject is at least deserving of full investigation.

The instruction, or rather the system of instruction, in the use of the rifle, although greatly improved in recent years, is not sufficiently practical.

Perhaps it is as good as any that can be desired for the teaching of recruits. But why a soldier once trained to understand his rifle and the best method of using it should go through the same routine year by year during his service is a question not admitting of a satisfactory answer.

At present there is but little in the annual instruction of our rank and file to fit them for the use of the rifle on service, excepting only the so-called field firings introduced within the last few years; all the rest is range practice under favourable conditions carried on chiefly with the object of attaining a high figure of merit for the company or regiment.

Something not far short of one-half of the rules to be observed in musketry training and of the consequent returns, reports, and correspondence are directed to this figure of merit, and the prevention, as far as may be possible, of irregularities in relation thereto.

But the highest attainable figure of merit is no indication whatever of the "service value" in respect of rifle fire of the instruction given and received.

It may indeed be quite otherwise. A high figure of merit obtained on ranges may be the result of little else than the care that has been taken to instruct in details and to *avoid* as much as possible all the disturbing causes incident to war.

These cannot *all* be assimilated in peace, but if not *all*, still *some* might be.

In the annual course of the trained soldier it ought to be sufficient that a limited number of rounds of ammunition should be expended in ordinary range practice—20 or 25 at the most—merely with the object of ascertaining that the soldier's early instruction is not forgotten, and it would be well also at this period to note the condition of eyesight which may vary considerably from year to year.

The rest of his annual firing should follow on fatigue and exertion, such as marching, running, climbing hills, crossing broken ground, a night, or a few hours on outpost, etc., all of which are easily practicable. Bad weather and bad or indifferent ammunition should be accepted as they come.

And above all both firing and the previous exercise should take place in the *full marching* order dress in use in the climate where the soldiers may be serving.

The efficiency of a corps should be tested, not upon simple shooting at targets, but upon what is done under conditions assimilated as closely as possible to actual service; and there is or should be no difficulty about obtaining these conditions.

Since the introduction of long range arms, the practice of judging distances accurately has increased greatly in importance; and here again the necessity for attention to "eyesight" of soldiers becomes evident. Medical evidence shows, beyond doubt, that a considerable percentage of the men in the ranks of regiments do not and cannot distinguish objects clearly at anything approaching the distances at which they may be called upon to fire; it is a matter the investigation of which ought not to be delayed.

Only within the last few years the discovery was made that large numbers of men in positions of responsibility as regards the public safety, guards and drivers on railways, pilots and officers of vessels were so defective in sight, many being absolutely colour-blind, that they could not distinguish one light or signal from another. The discovery resulting in strict and careful examination and testing.

Surely the duties devolving on soldiers need equal precaution.

As to the ability to judge distances, assuming that eyesight is fairly good, the present mode of instruction seems hardly calculated to give the best results on service.

It is carried on far too much on known ground and under conditions that hardly vary from year to year.

It may be well that a certain amount of instruction should be given in detail in the ordinary way. But the bulk

of a trained soldier's practice should be on unknown ground, alternately hills, valleys, and level ground; and frequently during a march on any objects that present themselves in any direction, distances being afterwards measured as nearly as circumstances admit.

Practice should also take place in different lights. The light at daybreak and that at sunset is different, leading to considerable errors.

Estimates of distances by star or moonlight would be a useful practice in respect of outpost duty at night.

Above all, it is most necessary that those who have the responsibility of controlling and directing the fire from the ranks should themselves acquire the habit of quickly and rightly appreciating distance under varying conditions.

The several methods of firing ought to be considered chiefly with reference to active service.

Perhaps the first and most necessary point is that a soldier should be able to shoot with ease and accuracy from any position or situation in which he may be placed, either standing or kneeling or lying down on any kind of ground, amongst woods or rocks, behind barricades—through loopholes, making the best of available cover. To facilitate his movements, practice in time of peace is needful, and there should be no difficulty in affording it if suitable ground is selected over which individual soldiers can make their way, directing their fire on objects previously pointed out to them.

The steadiest fire that can be obtained from closed ranks is probably that from sections of companies, both ranks kneeling. The commanders of sections thus disposed are able to maintain very effective control; they can look well to their men, and at the same time observe all that is going on amongst their opponents. They cannot well do this if either one or both ranks are standing. Besides, there is the advantage of offering a greatly reduced target to the action of an enemy; excepting perhaps in the case of firing steadily in volleys with both ranks kneeling, there can be little doubt that the fire of the second rank has a disturbing effect, tending largely to inaccuracy and waste of ammunition.

A question well worth consideration is whether it would not be better under most circumstances to confine fire to a single rank. The second or supplementary rank lying down would suffer less loss and be ready to continue fire if ammunition fell short, or to fill vacancies from casualties amongst their front rank men. The volume of fire from a single

rank is of course less. But by increased steadiness and accuracy the effect would in all likelihood be equal if it did not exceed that from two closed ranks firing simultaneously; expenditure of ammunition being very greatly reduced.

Firing at all from a standing position is open to the great objection that exposure to loss is of necessity greatly increased, more especially in reference to the high velocities and consequent flat trajectories of modern projectiles.

At times, and under particular circumstances, it may be necessary for soldiers to fire standing up, but it is a position that should be avoided as far as possible. As a general rule, it offers no advantage, it entails needless loss, and what is of no small importance is that the company and sectional commanders stationed in rear are in a great degree prevented from observing and directing the fire of their men.

THE ENCOURAGEMENT OF FENCING.

BY LIEUTENANT F. C. LAING, 12TH BENGAL INFANTRY.

The subject of fencing for officers of the army has of late been frequently dealt with in this Journal and also in the Press. All the writers alike have been unanimous as to the necessity of men who are armed with the sword becoming proficient in its use; but up to date there has been really no scheme in particular advanced by which such a result might be reached. Before offering my suggestions as to a possible way of securing efficient swordsmen in the army, I would like to relate the experience of an intimate friend of mine in the matter, in order to show how with the best intentions it seems impossible to secure any permanent interest in this very fascinating pastime. When in England on leave a few years ago, this officer attended two Schools of Fence—one in London and one in a South Coast town—for the purpose of being instructed in foil-fencing; in the latter he was taught the regulation method, common to Serjeant Instructors in the British Army, and became sufficiently expert to be able to hold his own with ease with his instructor, but this did not by any means imply that he was any use against even a fairly good man; in London he was taught the French method, and as his instructor was a really smart man, he considerably improved, but was still far from being considered a fencer in the proper meaning of the term.

On his return to India, he suggested to his commanding officer that it would be a good thing to start a fencing class in the regiment, and offered to do his best to teach the officers and any one else in the station who cared to join. The Colonel, being an enthusiast in all schemes for the greater efficiency of his regiment and a lover of all forms of sport, at once fell in with his plan, and after considerable initial outlay on the part of the officers of the regiment for foils, masks, etc., he started his fencing class. Like all fresh ideas, it was at first fairly successful, but the class died the usual death from inertia, for, with the exception of the Colonel, who persevered and who finally became about as proficient as himself in a few weeks, the class became practically non-existent, and the hot weather finally put an end to it for good.

The experience related above is, I fancy, what would happen always in similar individual efforts, and it is my purpose

to offer one or two suggestions which might possibly be found to work more satisfactorily.

Let us take for granted that a knowledge of the use of the sword is as essential to all officers as the use of the revolver. We already know that nearly all British officers are enthusiasts as regards sports and athletics, and yet one of the finest exercises in the world is practically ignored, more from ignorance of its delights than from any other cause, by almost every British officer in the service.

There still appears to be some doubt in the minds of the authorities as to the advantages of the new sword exercise of 1895, and the first thing to do is to determine on some method, French, Italian, English, or any other which seems best all round, for a method, even if defective, can be rectified by degrees as time and experience point out, and, any way, some system is better than none; and the next thing is to induce officers to become proficient. This *cannot* be done by merely issuing orders, nor by Inspecting Generals; and we already know what a farce the "toasting fork drill" is as usually shown to the latter under the misnomer of Infantry Sword Exercise; as a spectacle it is possibly not devoid of humour, but for teaching a man how to defend his own life is worse than useless.

We will then take for granted that it is considered worth while to introduce practical fencing into the army at large, and the system being agreed upon, a certain amount of expense must be incurred in securing so desirable a result.

It is only in England and on the Continent that experts can be found to teach, and consequently it is in England chiefly we must induce officers to learn the art. Considerable expense is incurred in attending the various schools of arms in London, and this also contributes largely to the reluctance displayed by most officers when at home on leave to take lessons. I would therefore venture to suggest that the following plan be adopted, or at all events tried:—Let one officer at least from *all* regiments, British and Native, be granted a free return passage from England on the production of a signed certificate that he is capable of instructing efficiently in fencing. It is not probable that more than one or two officers in each regiment even then would be inclined to go through the qualifying course and pay the necessary fees, but in any case we should probably in a year or two get a very large percentage of capable fencers, and by degrees a non-fencer would almost cease to exist.

There are several excellent schools of fence in London, at any one of which efficient instruction can be received. When an officer considered himself sufficiently expert, he should then go before a board assembled periodically in London, and then

be tested as to his skill, and the board should give the necessary certificate entitling him to apply for a free passage out to India.

It may possibly be argued that it should not be necessary to offer any pecuniary inducement to officers who should be only too ready to perfect themselves in everything pertaining to their profession, but such an argument is fallacious, for it might be applied to every other part of an officer's training, and it might be urged that no keen and patriotic soldier should require any remuneration at all for his services. If a thing is worth having it is worth paying for, and as it is true one cannot get anything in this world for nothing, so is it true that we cannot obtain fencers without making some efforts and putting our hands into our pockets. In addition to free passages, all swords, foils, and fencing gear generally should be supplied gratis to all regiments for the exclusive use of the officers, and as fencing became more generally known and appreciated, one officer, say the best swordsman, should be appointed in each station to inspect and see that the regimental instructors remained up to the mark. All the instructors should receive a small staff allowance, and a staff appointment might well then be made in each district, and a Deputy Assistant Adjutant General for Fencing be posted to each Command.* If it is considered advisable for the sake of the efficiency of the army that staff officers should periodically inspect regiments as to their shooting capabilities, surely it is worth while to have others to see that the officers in those regiments are as proficient in the use of their weapons they are armed with as the men they command.

It is true that efforts have been made of late years to improve both fencing and revolver shooting, and there is no doubt that the latter has undergone some slight advancement, but fencing is in much the same backward state as ever it was; one or two classes have been formed, for example the one in Simla, but however excellent the latter may be, it can at best turn out a small number of good men, and the army at large is in no way benefited. The whole matter in fact appears to lie in a nutshell. First, do the military authorities consider it worth while to have their officers as well trained in the use of their weapons as in the other details of their profession, or do they also consider fencing as "all nonsense" as apparently so many officers do? Secondly, if fencing *is* worth cultivating, it is worth some expense and trouble; if not, then the sword might well give place to a club or battle axe, the two latter being far more likely to be effective in the hands of the inexperienced than

* If the Inspectors of Gymnasia were trained fencers, as they should be, they might surely carry out these inspections.

the best kind of sword. It is a sad fact, but also a true one, that at the present day, when every other European nation is going in for fencing more than ever, we remain impassive; so much so indeed that probably in the whole of the Indian Army and even at home a really good swordsman is but rarely to be met with among army officers.

The British officer being, as a rule, so keen on all forms of exercise, it should surely not be difficult to make him soon learn to love the art of fencing as much as any other branch of sport; and it appears to be simply criminal folly to allow officers—*i.e.*, the leaders of men—to go on service and into action with scarcely the most rudimentary knowledge of how to defend themselves if attacked. To say we shall never fight at close quarters is absurd; it will and must happen over and over again in European warfare, and happen still more in fighting with uncivilized foes.

The privilege of a free return passage may seem but a small inducement, though to a subaltern and even a captain who has been having the best of times at home it would be most acceptable. It is true a difficulty might arise as to which officer might be granted the indulgence in a case where two or three officers out of one regiment qualified; but this might be got over by one special officer being nominated by the commanding officer before leaving for home; or, lastly, it might even be thought worth while to grant such passages to every officer who qualified, though this is perhaps too much to expect from even the most paternal of governments.

One obvious question remains to be answered, and this is, how could fencing be made general and also popular even if there was a regimental instructor in each regiment? The answer assuredly lies in the fact that seeing there no longer remained any excuse for officers being ignorant in this branch of their professional knowledge, each commanding officer would make a point of ensuring that all his officers became fair, if not good, fencers, and that the efficiency of a regiment would be judged as much by this as by all the other items which go to make up its reputation. The popularity of fencing would come of itself; and it should always be remembered that an officer who through his own negligence or want of skill loses his life in action is guilty of a crime against his country, for the only chance a nation has of ultimate victory is by having a sufficiency of officers to lead her armies; and in this country especially, where so much fighting takes place with only semi-civilized enemies, and officers are always singled out for special attack, more than ever is it necessary that each should be able to hold his own both with revolver and sword.

DUELLING IN THE GERMAN UNIVERSITIES.

BY CAPTAIN G. H. COLOMB, 1ST-4TH GURKHAS.

Some years ago I had the honour of belonging to a corps of students at Bonn University, and I now propose to give a short sketch of the manners and customs of the German student as regards the use of the sword. A young man of 18 leaves his home and proceeds to the University at the nearest large town. On arrival he is at once pounced upon by a Committee of the senior members of the "cap corps" as they are called, and his lineage and parentage closely enquired into.

A certificate is then given to him that he is eligible for membership of one or two corps, as the case may be, and ineligible for the remainder. There are from five to eight corps or "sets" in every university, and according as one's rank in life is, so is one graded in the corps.

There are white cap corps, red cap corps, green cap corps, etc., etc. The white caps, as a rule, only admit sons of nobles, princes, or high-born foreigners. The green cap corps comes next and takes the sons of the lower military and naval men and a few "*nouveaux riches*." After this follows red, blue, and other corps which look after the sons of shopkeepers, tradesmen, etc., according to rank. On entering the hired committee room of his new corps, the newly joined is initiated into the mysteries of the "Kneipe," or drinking bout, and some few days later is called upon to attend the fencing class, with a view, if sufficiently proficient at the end of six weeks, to take the honourable part of fighting for the honour of his corps.

All the new comers of the term are placed under an instructor paid by the corps, and classes are formed according to proficiency.

Within six weeks after commencement of the term, the senior men of each corps meet together at a "Wirthshaus," or hotel, and draw lots for adversaries, corps by corps. That is to say, the white caps draw to fight the reds, while the greens fight the blues. The dates are then settled, and the number of duels per day according to the number of new recruits for the term.

Each senior member then communicates to his corps committee the dates, etc., and the committee then proceed to

the fencing class to pick out those whom they may consider sufficiently expert to do honour to their corps with the sword, according to the number that their adversaries may have to pit against them.

The seniors of corps then exchange the cards of those chosen with the chosen of their adversaries, and it now only remains to determine the house in which the duels are to take place, and to engage the doctor or surgeon.

The choosing of the house is a difficult matter, as most hotel proprietors are very reluctant to run the risk of getting into the hands of the police, for this duelling, although secretly countenanced by the authorities, is very severely dealt with if carried on too openly. Finally, the room is hired and the services of a surgeon engaged.

Everyone appears in his corps colours, *i.e.*, a round coloured cap, peaked in front; but it is not obligatory for all members to put in an appearance. As a rule, the onlookers are there by roster.

The selected antagonists for the first round are dressing in an off room, and a round of applause greets them as they enter.

Each man has his helper, or second, whose duty it is to attend to the refreshing of his principal's inner man with beer or whatever he may fancy, and to give every assistance to the surgeon in bandaging, etc.

A committee of three experts then station themselves in positions of vantage for the proper supervision of the work before them, and are ready to give their decisions for and against.

At first sight one is rather staggered at the appearance of both combatants. The eyes are protected by wire spectacles and the neck apparently encased in an old fashioned stock collar, but on close inspection it is found that this is a thick cloth or leather bandage three or four fold round the neck. A double jacket of either thick cloth or leather covers the body from neck to waist.

The sword arm is bandaged in three or four or even five fold cloth from shoulder to wrist in such a manner that the play of the shoulder and wrist is free, while the elbow is kept braced up and powerless to be moved in any way.

From the above it will be noticed that no sweeping cuts either back or forward can be delivered, and that consequently only three descriptions of tendons and muscles can be used, that is, the wrist alone, the wrist and shoulder, and the shoulder alone.

The commonest and most successful cut therefore is a small circular cut from right to left and upwards, using the wrist power only.

Cuts may only be given across the face and head and none lower than the chin.

The cuts are therefore of two kinds—from right to left and from left to right horizontally.

Cutting downwards or upwards is, in most universities, forbidden.

The guards are of two kinds only, for the reasons (1) that the arm is straight and the sword hand below the level of the chin; (2) that no cuts upwards or downwards are allowed; as follows:—

Right (point upwards) }
Left („ „) } formed by using the wrist only.

The parries—

Right (point upwards) }
Left („ „) } formed by using the shoulder only.

Cuts and guards as well as parries are, as far as possible, restricted to a limit either way of six inches sweep; consequently all the movements of the combatants are so quick that it is most difficult to follow each attack or defence, as the case may be; and to the eye of a new comer it would appear that the opposing parties were merely tiercing.

It is only when he is suddenly made aware by the soft fall of the sword on the face (which gives a very peculiar sound) and by the non-existence of the clash of the opponent blades that something unusual has happened that he begins to grasp the fact that they are in earnest. Distance is proved to the front only in the same manner as is done with our foils, but instead of the attack being beaten, and the right or left foot advanced, as the case may be, we find that the feet and legs may assume any position most suited to the assailants, and the arm that is free may be placed either behind the waist or allowed to hang loosely from the shoulder.

The hilts of the swords vary very much. I have seen some with only a plain cross-guard, while others again are made in the same way as our infantry sword.

The length of the blade is usually from 3 feet to $3\frac{1}{2}$ feet in length, about $\frac{3}{4}$ inch broad at the base, tapering to $\frac{1}{4}$ of an inch at the point. Up to within 4 inches of the point the edges are smoothly rounded off, but from that point it becomes double edged and sharpened like a razor, so that the slightest touch or resistance will lay open the bone of the face or head.

The actual point of the sword, being about $\frac{1}{4}$ of an inch broad, is rounded off and sharpened in the same manner, allowing a horizontal cut, just touching the skin, to lay it open at once. The most common wounds are therefore those just taking off a small portion of the scalp above the forehead, and cheek and lips cut.

It may be surmised that, although full play is not allowed to the elbow, owing to its being, so to speak, bound up in a splint, that not much can be done in the way of inflicting a severe wound; but if one takes into consideration the formation of the point of the sword, sharpened like a razor and rounded with the continuation of its edges on both sides brought to razor fineness, it will be found that a very ugly cut can be given or received.

On one occasion one of the opponents cut his man across the ear. The defence was just too late in his parry, but succeeded, before the completion of the cut, in catching his adversary's blade, with the result that the sword of his assailant was pressed upwards, and the cut, instead of being a small horizontal incision became a circular wound from the ear to the eye, leaving the whole of the cheek bone exposed.

Two minutes' time is allowed between each round, the round itself lasting but three minutes. A cut on the head or face is not considered sufficient to make the antagonist retire from the fray. He is at once bound up and allowed to commence again if he so wishes it.

A maximum of five rounds is allowed, and should neither opponent have succeeded in touching his man within that time, both are retired till such time as may be found convenient for resuming hostilities. The practice of duelling is not satisfactory. The honour and glory of success goes entirely to the corps, while he who is vanquished must prepare himself to fight again as soon as his wounds permit of it, until he has in his turn overcome an opponent, when he can then rest on his laurels and fight or not as he chooses.

With the exception of a very few cases, most students, after having once vanquished their men, prefer to remain a conqueror, and do not usually care to tempt fate again.

There is, however, one good word to be said for this old established custom. It teaches a man to rely upon himself when danger is concerned; it tends to train him to exert that moral courage which may at any time be required from any human being; it trains the eye to quickness and precision, and gives an impetus to both mind and body for the time being, the effect of which in after life can never be lost.

OPTICAL LANTERN APPARATUS FOR THE INSTRUCTION AND AMUSEMENT OF THE TROOPS IN INDIA AND ELSEWHERE.

BY COLONEL T. DEANE.

The Army Orders marginally cited show the system under which optical lantern apparatus is supplied to the troops in the various Commands.

Army Order, dated 1st July 1888
Army Order No. 152, dated 1st October 1894.

Briefly, the system is that of supplying and circulating lanterns and slides to the chief military centres and of encouraging officers and schoolmasters to use the apparatus for the instruction and amusement of the troops. The apparatus now in use is as follows:—

Lantern.

I.—Single optical lanterns, with 4 inch diameter plano-convex compound condenser in brass cell, and double combination achromatic front lenses in brass mounts, with double pinions to the rack adjustment.

Illuminant.

II.—Russian iron 3 or 4 inch paraffin lamp, with wicks 2 inches wide; silver reflector; chimney with three draws.

Screen.

III.—Linen screen such as is ordinarily supplied with lantern apparatus.

Carrier.

IV.—Carrier frame of the ordinary type for unmounted slides, but the slides are usually supplied framed.

Slides.

V.—Slides of the uniform size, $3\frac{1}{4} \times 3\frac{1}{4}$ inches, generally framed, packed in boxes and put in circulation according to the list shown in the General Orders referred to.

VI.—Oil and wicks are supplied regimentally. Screens are washed under similar arrangements, and the apparatus is usually left in charge of the regimental schoolmaster to use occasionally.

Although the provision of this apparatus must cost, in the aggregate, no small sum, the results obtained are not very satisfactory; for the entertainment provided is not a popular one, and it is generally looked upon as of a childish nature of the old magic lantern kind.

The object of this paper is to show why the present apparatus fails and how it could be improved. Scientific optical apparatus has, together with photography, made great advances during the past few years, and most colleges and public institutions have the best appliances for demonstrating many beautiful phenomena on the screen.

Although it is generally admitted that the claims of the optical lantern as a scientific appliance for educational demonstration are almost unrivalled, many are deterred from using it in consequence of strange misgivings as to cost and the danger and difficulty of working it. The appliances at present in use in the service are so nearly obsolete, and the method of getting even the best results from them are so little understood, that a little explanation of the matter may, perhaps, lead to results which may prove of use in future. To prevent misunderstanding, however, it may be well to say here that no suggestion is put forward for the use of any portion of the scientific apparatus referred to which has not been subjected to constant and repeated practical trial in India by the writer.

Hepworth, in his admirable book on the lantern, observes :
 * * "The magic lantern is now no toy, but is recognized as a valuable aid to education far and wide. The reason for this is not far to seek : we have to look to the vast improvement in the instrument itself. So long as the greasy, evil-smelling oil lamp was almost the sole illuminant available, and roughly-executed daubs in varnish colors, the only works of art, it did not much signify that the lenses were also of a faulty character * * but when the brilliant lime-light came to be adapted to the lantern, it was at once seen that the capabilities of the instrument were not only much increased, but almost without limit * *. There are few branches of science in which the optical lantern cannot be made useful for purposes of demonstration, and in every lecture theatre worthy of the name, the instrument is already constantly called upon to illustrate various subjects * *. During the past few years the number of those who interest themselves in the lantern and its capabilities has been vastly increased by the sudden popularity of the art of photography. Amateur photographers are now to be found

in every town in the kingdom, and they are beginning to find out that there is no better method of showing their friends the pictures they have taken than by means of the optical lantern."

Since these lines were written, other works have been published on the use of the lantern in exhibition and scientific demonstration, such as—

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| "Optical Projection," by Lewis Wright . . . | Longmans, Green & Co. |
| "Light; a Course of Experimental Optics," by Lewis Wright . . . | Macmillan & Co. |
| "The Optical Lantern," by Andrew Pringle . . . | Hampton Judd & Co. |
| "The Art of Projection," by an Expert . . . | E. A. Beckett & Co. |
| "The Indispensable Handbook of the Optical Lantern," by Welford and Sturmley . . . | Iliffe and Son. |
| "Handbook on the use of Compressed Oxygen," by Kenneth S. Murray . . . | Dearberg & Co. |

There is also the Lantern Manual by Chadwick (F. Warne Co.), a practical lanternist, and others, such as Noakes, Hughes, Riley, Tyler, Newton, Stewart, The McIntosh Battery and Optical Company, Chicago, and many others.

As an up to date monthly journal in all such matters, the *Optical Magic Lantern Journal and Photographic Enlarger* is of the greatest use.

J. Hay Taylor.

There are probably very few, if any, regiments or batteries in this country, which do not contain some individual interested in photography and capable of making photographic slides; and many would be encouraged to do so were there apparatus at hand from which these slides could be projected on the screen. The field of demonstration is so vast that it may be said to be partially without limit, but a few subjects may be here referred to as of special interest to the service, such as musketry and all appliances connected therewith, artillery, guns, trajectories; maps of all kinds, horses, and war material; plans of defences; military manœuvres; pictures of campaigns and of actual movements in the field, etc., etc.

Of nearly all these subjects, either excellent drawings or photographs by officers and others are available which could be easily reproduced as lantern slides; but even were it not so, the published lists of photographic slides show how many subjects of interest there are, together with printed lectures available, for both instruction or amusement. They number now over 100,000, and if these be not sufficient to select from,

almost any series desired can be produced at an average price of about 2 shillings per slide. Some of the most effective and satisfactory in the market are obtainable of the Woodbury Photographic Company at 8 shillings per dozen.

Speaking from practical experience, however, it may be said that many interesting views of military and other subjects have been produced by amateur photographers in this country, as lantern transparencies, much superior to the majority of the trade productions in England. Possibly the conditions of light and climate in India may account for this, but *experto crede*.

If this art of amateur photography be suitably utilized and encouraged amongst officers and others who have always the greatest interest in the instruction and amusement of their troops, how many a dreary evening can be saved them and how profitable can be made the apparatus, which at present lies mostly unused, owing to the means of getting proper results therefrom being insufficiently understood.

Many dozen lantern slides can be contained in a small compass, and when it is realized that each can be projected as a picture 20 feet square, by means of the optical lantern, the utility of this appliance becomes apparent, and the question arises whether more use might not be made of it in the direction of the photography of military maps and other subjects in our Intelligence and Survey Branches and elsewhere. There are other means of using this appliance for military purposes with advantage; for example, Chadwick writes—

"During the Franco-Prussian war, when Paris was in a state of siege, and communication with the outer world deemed an impossibility, despatches and copies of war papers were, by means of photo-microphy upon thin films of collodion, carried by pigeons to the interior of the capital. These films, which were about 2 inches long by 1 inch wide, contained each copies of sixteen pages of despatches, each page consisting of 5,000 letters, the reduction being the eight-hundredth part of the size of the original. Twenty of these despatches could be carried in a quill, attached to the tails of these novel postmen. As soon as the despatches were received at the telegraph office, they were placed between two plates of glass and placed in the microscope lantern, a powerful light being employed, and the characters were reproduced of sufficient size to be read and copied with ease."

When it is considered that the whole appliance necessary for such a reproduction can be easily carried on a single mule,

its value should not be overlooked for operations in the field. Further, it may be observed that the present arrangements for night signalling are susceptible of great improvement by the provision of a better light than is now in use. It is understood that the Signalling School at Aldershot has been trying for the last three or four years to get a portable electric light for night signalling, but have not been successful to date. If the flash light now used, of 20 to 40 candle-power, gives useful results at night, when often the heliograph cannot be worked owing to cloudy weather during the day, what can be obtained from a light of from 400 to 800 candle-power? The School of Military Engineering, in its Balloon Section, has to provide for the carriage of considerable numbers of cylinders charged with an explosive gas, but all that is required for a powerful light is a single small cylinder charged with oxygen, which is non-explosive.

As has already been shown, the radiant employed in the lanterns used in the service is the common oil or paraffin lamp. This is the main defect of the system; for without a good illuminant, the projection of photographic pictures on the screen is impossible, or at least the results thereby obtained are so comparatively poor that they may be said to be scarcely worth the trouble and expense involved.

Various mineral oil lamps are in use, and for them different powers of illumination are claimed. Amongst the best are the Refulgent (Newton) and the Pamphengos (Hughes). The principle is much the same in each: the burner is composed of four wicks, placed parallel with each other and axially in the lantern. Advertisements show that a light of 150 to 200 candle-power is thus obtained, but the real power of the best form, measured by the light of a standard candle, is rarely more than 80 to 100, if so much.

A series of experiments in photometry have given the following averages of several illuminating powers:—

	Candle-power.
Ordinary paraffin lamp, 4 wicks, 2 inches wide	
Oxygen spirit jet, soft line	75 to 95
Lime-light blow-through jet	152
„ mixed jet	260 to 325
Saturators, Gridion and Lawson	475 to 542
	400 to 600

With increased gas pressure and a larger orifice to the jet, the illuminating power of saturators can be increased to 800 candle-power.

Before explaining what is considered the best light to use in India, it is necessary to refer briefly to the various kinds of lime-light. Of these there are four systems—

(a) The oxy-calcium or spirit jet, (b) the blow-through, (c) the mixed, and (d) the ether oxygen, all of which depend for their illuminating properties on the incandescence of a piece of lime by the impact upon its surface of a jet of oxygen passed through, or mixed with, a hydrogen or other flame to obtain combustion; for oxygen by itself will not maintain a flame. Thus, it will be seen that for all these lights, the making of oxygen, or the purchase of it ready-made, is the first necessity. Of these two methods, the latter is by far the most satisfactory. Taking the lights in the above order, practical trial gives the following results:—

- (a) Oxy-calcium, not worth the trouble, because the light obtained is little better than that of the paraffin lamp.
- (b) The blow-through. This requires two gases—oxygen and hydrogen—and as the latter is not readily obtainable in India, it cannot be generally used.
- (c) The mixed. This also requires two gases—oxygen and hydrogen—and as the latter is not readily obtainable in India, it cannot be generally used.
- (d) The ether oxygen. This requires only a couple of ounces of ether, an oxygen cylinder, and a saturator, and gives as good or better results than any of the others, and is therefore the best.

The saturator system is of comparatively recent invention; in its best forms the lime-light produced is precisely the same as with the oxy-hydrogen system, except that in place of hydrogen oxygenated ether is used, a current of oxygen being passed through a vapouriser, which contains fibre, saturated with ether, the vapour of which, mingling with the oxygen, is conveyed with it through the hydrogen tube of the jet to the mixing chamber, where it unites with a stream of pure oxygen. It is the simplest, most economical, and most powerful lime-light in use; and of the many kinds recently introduced, probably the "Lawson" and the "Gridion" are the best. These are practically small lime-light lamps and

are made to fit any single lantern without alteration, and are so simple in construction that any person with a few hours practice can easily work them. The higher the temperature the better they work.

With regard to the purchase of oxygen gas ready-made and compressed in cylinders, these are now manufactured in England in large numbers. It is said that in London alone over 60,000 are in daily use and many are sent all over the world for various purposes. Those who wish to study the commercial production of oxygen, the system of compression and storage in cylinders and of its industrial application should read the Handbook of the Brins Oxygen Company (Westminster) and the reprints from the Journal of the Society of Chemical Industry on this subject.

Cylinders of various sizes are made, from a capacity of 10 cubic feet of gas, 4 inches outer diameter, 19 inches over all, 15 lbs. weight, to 100 cubic feet of gas with 93 lbs. weight. The size found most suited for India is that of 60 feet gas capacity, 29 inches long and 54 lbs. in weight. An ether saturator will burn about $1\frac{1}{2}$ cubic feet of gas per hour, so that with two cylinders in use a fair supply of gas is available for a year for even weekly exhibitions if the expenditure average 2 feet of gas each time. The gas does not deteriorate by keeping, and the pressure is only slightly increased in high temperatures. The charge for compressed gas is only 2d. per cubic foot, so that two cylinders are charged for £1. There are certain accessories required with the cylinders and saturator, such as regulator, pressure gauge, key, and nipple union, limes, ether, etc., and they will be enumerated in a statement showing the comparative cost of working the lights under the present and proposed systems whether for optical lanterns for instructional purposes or for signalling lights in the field.

What is mainly required, however, is first a recognition of the fact that the appliances at present in use are out of date, and that to get an adequate return for the expenditure involved a change is necessary. It appears from the Army Orders quoted that lecturing is not compulsory upon schoolmasters, but they are required to give to lecturers, duly authorized to use their school-rooms, all the assistance in their power in the management of the apparatus and all reasonable assistance in any other way before the commencement of the lecture season. It is also noted that any special matter requiring a decision should be referred to the Director General

of Military Education. No doubt it might be arranged under his orders that Superintendents or Inspectors of Army Schools could show Army Schoolmasters how to work the improved apparatus, and thus results might gradually be obtained of a kind more proportionate with the expenditure involved. In India open air lectures are more suitable than those held in hot barrack school-rooms. The lanterns should therefore be supplied with front lenses of at least $2\frac{5}{8}$ inches diameter, double combination achromatic, 10 inch equivalent focus power, capable of showing a picture on a 20-foot screen, about 50 feet distant. Portable opaque screens should also be provided, and the list of slides seems susceptible of revision and improvement.

The statement attached shows what is believed to be the cost of the apparatus now in use with the troops and what the actual cost (exclusive of freight, customs duty, etc.) at English prices of the proposed apparatus. Presuming that the lanterns now in use could be fitted with the lime-light accessories required, the additional cost per station would be from £20 to £25, and the working cost about 2 shillings per hour of exhibition against a nominal charge for the oil light.

It would be perhaps advisable, if anything be done in the direction proposed, to try the apparatus at one or two stations to begin with, though there can be but little doubt its general introduction would be of advantage, and would afford amusement and instruction to thousands who now derive very little of either from the system in its present condition.

A PORTABLE WEIGH-BRIDGE FOR CHECKING CART TRANSPORT LOADS.

BY MAJOR M. MARTIN, R.E.

I am not aware whether the above is a desideratum for Indian transport. It appears that it might easily be so for the following reasons, which are almost self-evident.

The endurance of every draught animal must depend (among other conditions of proper treatment) on his not being overtaxed, and though doubtless on commencing a campaign his task is allotted to him carefully and within his power, he will from week to week require a re-adjustment as his strength diminishes from hard work, campaign diet, and long hours.

Notwithstanding the consumption of supplies, the tendency is greatly to increase the load on each overtaxed animal—sometimes necessarily when casualties occur among draught beasts, sometimes wantonly when extra and unauthorised loads are added to the calculated maximum.

It is hopeless to expect that the tendency to overload will ever be eradicated while the temptation is so great.

It seems such a little thing to add a stick for cooking, an extra blanket, a wearied soldier's arms or pack, or even the weight of a man to a cart-load that overloading will always require checking.

I am quite unable to estimate the waste due to this cause and the number of breakdowns thereby occasioned, but the loss of power attributable to it must be very great and its saving might be necessary to the success of an operation.

The remedy proposed would certainly be tedious and laborious, but as all success is largely founded on taking pains over details, this fresh labour might be worth undertaking.

If it is proposed to control the weights on each class of cart, the first step would be to paint the weight legibly on each vehicle, that is, the total weight, as it would be shown on an ordinary weigh-bridge.

A fairly simple apparatus for check would consist of two hollow sheet iron hinged troughs over each of which the off and near wheels would pass.

These would rest on very short hydraulic pistons playing in cast iron cylinders from which would issue a pipe terminated with a pressure gauge showing the weight on a dial face, as per diagram annexed.

A slight excavation for the pressure cylinders would enable the wheel trough to be laid with only an inch or two rise in the ramps, and the whole of the apparatus *might* again be enclosed in a further envelope of light sheet iron if it were found desirable to fill up the earth level all round so as to allow for the erratic bullocks and the unscientific driving on to the bridge.

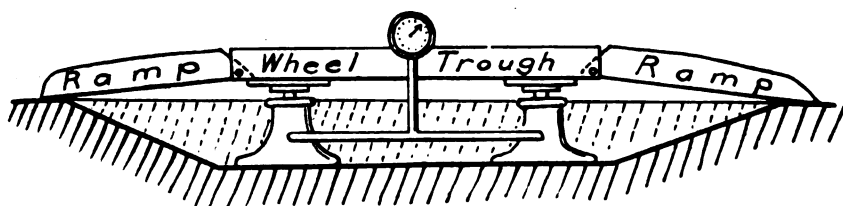
A little fencing and two gate posts would be an assistance to marshalling the carts or waggons.

Such checking of cart-load weights would, of course, be excessively laborious, but would by no means be a daily labour but for occasional use only. The very knowledge that such a means of detection existed would act as a deterrent, if offences were visited on the jemadars of sections or other officials retained to prevent such irregularities.

Opportunities would of course be sought on days when time permitted a check to be taken, and the whole transport might be dealt with in sections and not *en bloc*.

If the operation is desirable there would be little difficulty in constructing a portable weigh-bridge, but it would be too costly to construct unless on a Government order.

WEIGH-BRIDGE



THE MILITARY MEANING OF "PARTISAN."

A CRITICISM BY MAJOR A. C. YATE, 2ND BALUCHIS.

In the January number of the *United Service Institution Journal*, Captain Burton has introduced to our military vocabulary a new word—the word “partisan.” From his quotation from De Brack on page 41, it appears that the French use the word “partisan” in the sense in which he wishes us to use it. From his footnote on the same page, it appears that Russian military writers have borrowed it from the French in the same sense, just as they would be likely to do. To Englishmen it is unknown in the sense in which French and Russians use it, and they are not, I think, very likely to adopt it. Nor do I think that as a rule Englishmen who have read Napier’s *Peninsular War*, would, as Captain Burton does, apply the term “bandit” rather than “partisan” to “the Spanish guerillas who harassed the French during the *Peninsular War*.” Whatever their character and mode of operations, they were contributing to the great end of driving the French out of Spain. The word “bandit” is not more correctly applicable to them than the term “dacoit” was to the Burmans who opposed us in 1886-87. In the English language the word “partisan” as a military term essentially indicates irregular troops. It is a term that would be applied, say, to the Garibaldians in Italy and the Carlists in Spain or the insurgents in Crete. We have, it is true, borrowed many military terms from the French, but when we have such a good old simple word as “raid” why should we want to introduce “partisan operation”—a long-winded term with a meaning which is as yet quite unfamiliar to us? The great campaign for raids was the American Civil War of 1861 to 1865. Looking through the *Memoirs of Generals Grant, Lee, and Sheridan*, I find no other term but that of “raid” applied to independent operations in which sometimes as many as 10,000 mounted men—cavalry and artillery—took part. (See *Sheridan’s Memoirs*, Volume I, page 438, and Volume II, page 112.) Hamley takes no notice of raids, so cannot be quoted. Clery, only as it were by accident, touches on the subject, and then (page 399, edition 1893) has no other word than “raid.” We have then good authority for adhering to the word “raid,” and not adopting

the novelty proposed by Captain Burton. A word that requires a page of explanation (*vide* United Service Institution of India Journal for January 1897, page 41) is not a practical word likely to "catch on."

The usefulness of a paper is much advanced by any discussion to which it may give rise. We, accordingly, welcome Major Yate's contribution, and his criticism of Captain Burton's adoption of the term "partisan warfare." But we are not inclined to agree with Major Yate in his objection to the introduction of this novel term into our military vocabulary. We grant the novelty, and this seems to be its one defect.

Major Yate appears to object to the term "bandit" as applied to the Spanish guerillas of the Peninsular War. Now, unless we misread Major Yate, he favours the term "partisan" as applicable to this fighting body, to which, by implication, neither "raider" nor any other known term would apply. Major Yate, then, seems to allow that we have as yet no satisfactory word to express the operations of Spanish guerilla warfare. Parenthetically we may remark that we quite agree with Major Yate as to the inapplicability of the terms "bandit" or "dacoit" to describe respectively the Spaniard or Burman fighting to repel an invader.

We seem, then, clearly to lack in our military vocabulary some term which shall include irregular military operations generally. Major Yate prefers "the good old simple word raid;" and this word, we think, expresses, sufficiently well, detached and singular military enterprises; but, unless we are to use the expression "raiding warfare," it is useless as a generic term. Now, "raiding warfare" would meet with the same objection as "partisan warfare," and, to our mind, would be far less complete and satisfactory.

We are inclined to think that those who have dealt with the independent operations of the American war would have welcomed the expression "partisan warfare," for "raid" incompletely expresses these operations; but at least, since the former expression had not been invented, it is no argument against its employment that writers on the American war speak of "raids" only.

Major Yate considers that a term which requires such a full explanation as Captain Burton accords it is not a practical term. We think, however, that the explanation of any novel term, to be satisfactory, cannot be brief, and this objection, therefore, is but part of the originally admitted objection of novelty.

For our part we think that our military vocabulary would be enriched by the admission of some term to express that general form of warfare of which the raid is a specially marked feature, and until a better expression is invented, we are well content to borrow yet another military term from the French people, to whom we are already so deeply indebted; and we are inclined to believe, in opposition to Major Yate, that the term "partisan warfare" will be accepted by military writers to express such operations as those which Captain Burton has graphically described for us in *Hésmar's Raid*.

AIDS TO "KRIEGSPIEL."

Since the first introduction of Kriegspiel into the German Army it has undergone many sweeping changes. Regarded primarily more as a game than a means of training in tactics, and limited by the strictest rules, it has gradually assumed a less confined form, raising it to a level of importance that is recognized in our regulations.

Its value lies in the fact that it enables tactical principles to be tested with comparatively little trouble; rapid and definite decisions can be arrived at, and these again admit of rapid transformation into orders. Players learn to form a proper estimate of the influence of time, space, and the nature of the ground, are encouraged to think out the effects of their proposals, and, putting themselves entirely in the position of the commander, thus develop and train their power of conception.

The development of the game has possibly now reached its limit, without risk of endangering its simplicity. And yet its usefulness is not by any means so fully recognized as a closer acquaintance with its principles would admit of. It is therefore proposed to briefly show how it would be possible to extract better value from its employment as means of training in tactical questions, etc.

To start with, its very name points to the fact that it must be carried out, like other "games," with pleasure, and even a certain passionate eagerness, thus exciting to some extent the actual anticipations of service in the field.

One of the primary conditions of its attaining its object is therefore the existence of a thorough *interest* in the game. The attitude maintained, however, by many of our officers in regard to it is by no means satisfactory; interest lags, and it is often looked upon as tedious and irksome. That the fault by no means lies in the nature of the game itself is fully shown by the fact that some officers have started associations for playing regularly, and are most enthusiastic in their commendation of it from every point of view. Now it is wrong to suppose from this that the great majority of officers only study their profession under a certain amount of compulsion, and that the minority were zealous in the matter of military scientific matters, for there is no army in the world where the scientific portion of a military profession is so studied like the German.

The reasons for the above difficulties are not to be found so much in the system and method of play as in the conduct of the game. It has always been found that an ably conducted game is followed with universal interest. Then again it is often stated that to properly conduct a game of Kriegspiel is an art in itself that but very few specially talented officers can ever attain to. Many men content themselves with this assertion without even taking the trouble to test its accuracy.

Of course exceptionally able officers may develop the game into a science of a very high order, and indeed there is no doubt that to properly conduct it requires not only considerable concentration of the mind, but thorough and studious preparation. But it is wrong to suppose that it is impossible to attain this knowledge. There is so much excitement in the game itself that even those who scoff at its value would be compelled to follow it with a certain amount of interest, if they would only cease to minimise the element of reality in it. This, however, only requires the observance of a few simple and elementary principles. It is possible by various technical means to make it much less tedious.

The most dangerous element to be overcome in any work is irksomeness. If the introduction to a game is tedious, when it becomes necessary to examine the drill book and work out the small details connected, for example, with the duties of cavalry, the strength, routes, and conduct of each individual patrol, it is often hours before the actual game itself begins. Should it then be dragged out and the main idea be lost in working out subordinate details, then it is only natural that the interest of the player should flag. The instruction should therefore make it a rule to conduct the game with as much rapidity and ease as possible, and should also fix a certain limit of time. When one considers that games mostly take place in the evening after the performance of other professional duties, and that therefore it is impossible for the intellect to be fresh and clear, and further that it is very difficult for any one unaccustomed to several hours of intellectual labour daily to devote his mind to this kind of work, it may be taken as a maxim that a game of Kriegspiel, including discussions, etc., should never, as a rule, last more than two and a half or at the most three hours. But, it may be argued, the usefulness and instructiveness of the game is liable to be lost by superficial or rapid play. Before disposing of this argument it is first necessary to understand what the exact object of the game is. It may be asserted, for example, that the inventor's idea was not to follow and work out the tactical moves and regulations of the field service drill book in the smallest details after the manner of Verdy's ("Studies on Field Service") book. Such a system would doubtless be of the greatest use to junior officers if applied on a smaller scale as special problems. But the first object of the *real* game, as played by senior and more advanced officers, is, as already stated, to educate them to a certain standard of ability in forming decisions. Now, if it were attempted to accompany this with an examination of all technical details, not only would the game be absurdly protracted, but it would lose all its meaning; knowledge of the regulations must be therefore one of the primary conditions, in order that they may be rapidly applied on a large scale to such matters as the formation of schemes and drafting of orders. Play will invariably show to what extent this elementary knowledge has been obtained.

Another matter of great importance in carrying out the principles of the game is the question of "dispositions." The more extensive a game and the greater the number of units working together,

the greater is the demand on the ingenuity of the player, and the possibility of the instructor's interference in details is reduced.

The dispositions should therefore be as simple as possible, the general and special ideas being limited to certain conditions of space, while the strength of the forces should be proportionate to the capacities of the instructor and pupil. Of course the problems should not be too simple, otherwise the object of the game will be defeated. It is not, however, absolutely necessary to start with a complicated scheme in order to develop interesting situations. It is quite possible by selecting the country and imposing certain conditions to make a simple problem most difficult of solution. Moltke's tactical problems are an instance of this. On the other hand, it is only by the various measures adopted by the opponents that interesting engagements can be brought on a situation evolved from a very simple problem. Moreover, it is in no way necessary that all the phases of an engagement throughout the day should be religiously played out one after another. The instructor can, if he places particular value on certain details being discussed, select certain "episodes" and have them more clearly demonstrated. Of course there is an enormous scope for originality of ideas for an instructor, but still it should be laid down as a primary condition that all ideas should be disposed of within the fixed time.

Another matter on which the rapidity of the game depends is the amount of preparation made by an instructor. Of course particularly talented men can sometimes conduct an excellent impromptu game, but, as a rule, this is not the case, and so much depends on the management of the same that he should have thoroughly worked out the scheme beforehand. In the first place he should completely work out the problem and its various possible solutions, and consider the probable consequences of the decision arrived at by the opponents, which are always known before the commencement of the game. He should then form an idea of what will happen as regards major details that cannot be discussed during the game itself, and will be then able to draw up a complete rough programme as to what he thinks necessary to explain to the players.

The instructor (or superintendent) should invariably have an assistant to help in determining certain points, and ready with sketches and tables showing the depth of columns, time occupied in marching up, etc., without further delay or calculation.

Of course to a great extent it can be calculated beforehand at what time various columns will reach certain points, and then a note can be made on the instructor's map of probable roads, points of concentration, etc., etc. This assistant should take care that the technical position of the supervision (or instruction) occupies as little time as possible, keeping a regular time-table on which the movements and orders of both players can be marked down one against the other in exact chronological order.

By this system the instructor will be able to carry out all preliminary movements and orders more rapidly and enter upon the really interesting phases of the game.

And in this connection we are reminded of a great defect which often exists in supervision. We are of opinion that it is very important what system the commanders adopt in carrying out their decisions. Not only should it be known what they intend to do, but the precise nature of their orders and arrangements, as stated, should be invariably found out. One of the great points in the game is its usefulness in teaching men to express themselves clearly and definitely. The instructor should therefore never ask "What do you intend to do?" or "What are you doing?" but "What orders shall you give?" or "What are your orders?"

Instead of this it often happens that explanation is started at once with regard to the situation. These are often protracted and round-about, and time is unnecessarily wasted. As a rule, explanations should be allowed only with regard to "orders." Of course I do not wish it to be understood that there are not special cases, as, for example, when the situation admits of alternative courses, when it would be useful to give these explanations at greater length. But, whenever possible, the commander should be allowed a certain amount of time to make up his mind, so as to express himself shortly and clearly, this being explained to him before starting. The same thing holds good in the case of information being received which calls for special orders, the player being allowed as nearly as possible the same time that he would actually have to consider the situation and formulate his orders. Thereby also onlookers have time to study the game.

No conversation, therefore, so to speak, which does not take the form of orders, or explanations in special cases, should be permitted by the instructor. Questions, on the other hand, may and should be asked, and should be encouraged by the instructor, who will then make sure that each player has clearly grasped the situation.

Now, it may often happen that the orders issued are those least expected by the instructor. They will often leave much to be desired in the way of clearness and completeness. Sometimes orders are not issued at all just at a time when they may appear necessary to the instructor.

The latter should, however, avoid interfering as far as possible, and reserve his remarks for the consequent discussion. The object of this is that the consequence of vague and incomplete orders should be so evident on the face of them that the player will learn more by their exposure than by any amount of instruction. In the same way delay in giving orders will bring its own punishment with it.

This brings us to the second main principle which, in the interests of the game, no instructor should ever lose sight of, *vis.*, "*Free development and scope of play.*" Of course, he should take care that the players do not take up impossible positions, or that the matter does not become a farce; but he should never on any account influence a commander to take up a definite line of action, giving him an idea of his own solution of the problem. This can never be done without forcing a player's train of thought. Nor, again, should there be any such thing as assistance in coming to a

decision. Not only does this remove all interest and keenness of competition, but it prevents independent thought and action which should be the guiding principle throughout military training. Ill-temper or indifference are the invariable results. Besides which it is often the adoption of unintentional and erroneous measures that produces the most interesting situations.

All interference with the action of the players, therefore, should be avoided, and the orders be allowed to be issued literally as stated, even to subordinate commanders, however incomplete and erroneous they may appear, and no matter what situations are thereby evolved. Kriegspiel must be regarded as an object lesson, in which the pupils may find an opportunity of learning from their own mistakes. One may be quite certain of such mistakes being avoided in future. It is better also not to subject the action of a player to criticism unless he has been allowed to carry out his scheme absolutely unaltered. Any attempt, with the best intentions, to interfere even by a sign may easily give players reason to suspect that the instructor is not quite impartial.

Every opportunity should, on the contrary, be taken of encouraging players in forming their own ideas. All matters of importance should be communicated to subordinate commanders before the orders of the opponent reach them, or this can be done after the latter has made up his mind and issued orders. Considering the actual difficulties in distributing orders in the field, there is really nothing impractical in this. One should, however, allow a commander's orders to be carried out as soon as is compatible with the benefit of all concerned. It will be very often sufficient if subordinate commanders are not given their orders sooner than they could in reality receive them. This system will prevent them remaining inactive, waiting for orders, and then only following the game in a half-hearted way.

Should, however, a player appear likely to go off the line altogether, and force of circumstances demand that the instructor should step in, he should neither correct the commander's dispositions nor point out a definite line of action for some big unit of his force, but should give him information or otherwise warn him, so that he may yet find time to alter his plans and act judiciously. Another way to limit the length of a game without interfering is by the instructor's decisions as regards fighting. His powers as umpire are often not sufficiently utilized, especially as regards artillery. As a rule, it is highly improbable that batteries or other units would fire at one another for hours together at medium ranges without some damage being done on one side or the other; and although results obtained on the range cannot of course be expected in the field, decisions should be given quicker, especially with small units, except in the case of both sides being in unfavourable positions as regards observation. The same holds good as regards infantry against infantry or artillery at effective ranges.

In this respect an instructor's powers should not of course be unlimited. He should carefully weigh all elements of chance, and if one side is obviously the better, he should decide accordingly,

no matter whether it suits his scheme or not. It will be no easy matter to make these decisions, which will often depend upon individual circumstances, which in Kriegspiel must be "*assumed*." When decisions are given, they should be clearly demonstrated, that is to say, an attacking force should not merely fall back, but the commander in question should not be warned previously. In such cases the force withdrawn must be supposed to be out of hand for a certain time, the enemy's consequent action only allowing the beaten force to be reorganized. All decisions should be given as rapidly as would actually occur in reality.

Carried out on this system, Kriegspiel will undoubtedly require considerable tactical knowledge and capabilities. In the preliminary work cannot be extended beyond the first contact of the players. The further development of the game can never be actually arranged for, though eventualities may be thought out, events often take quite a different turn to that pre-supposed by the instructor. He must be therefore in a position to correctly and rapidly adjudge unexpected situations. Yet, after all, this is merely what is expected in any professional instructor, and there is a great amount of satisfaction in observing the practical knowledge gained by his pupils.

At the commencement of this paper, it was observed that one of the objects of Kriegspiel was the "training of the powers of conception." The game should, as far as possible, represent actual warfare, and the instructor should therefore do his utmost to make the game as realistic as possible. His descriptions should be vivid and attractive. Of course, all this requires a certain amount of imaginative power and rapid expression of ideas which should be put into a few and telling words as possible, and in this respect a good speaker will always have the pull. Yet, on the other hand, true intelligence and ability needs no artificial aid. The instructor merely requires to put himself in the place of his pupils, imagine exactly how he might be placed himself, and form a picture of what might actually happen and how he would act himself. He should carefully and thoroughly study the maps and plans to be used, especially noting all points of vantage likely to be used by the commanders of both sides. Then certain conditions should also be "*assumed*," such as the season, climate, light, temperature, all or any of which can be varied at will in different games. He should therefore think out such matters as the thickness of woods, construction and appearance of villages, nature of the banks, breadth and depth of rivers, condition of roads, fords, etc.—in short, everything that can possibly affect the movement and cover of troops and the efficient use of their arms, not forgetting to warn his pupils on all these matters, which are apt to be either forgotten altogether or remembered too late in the day.

In communicating information, an instructor should also be as realistic as possible. He should only impart information to several players together, when they would in reality be in the same place, and should only give information on points which the commander in question can himself observe, or what is brought him by messengers. Commanders, working together unseparated from one

another, should therefore only communicate regularly formulated and if possible written messages. This will have the great advantage of practising young officers in understanding messages, the most important and valuable points being rapidly grasped and orders put into execution. Verbal communication should be prohibited, and, as mentioned previously, a time-limit for this as for everything else must be fixed and understood.

The form in which information is given is also an important matter. It would be wrong, for instance, to say "the edge of the village is occupied by a dismounted squadron." It is only necessary to say that "firing from the village is heavy or feeble," for it would be impossible to determine what or how many troops were occupying a village until a lengthy reconnaissance had been made. It is often impossible to tell the strength of artillery, and the strength of infantry can often only be determined by the length of the line of skirmishers, while conclusions as to the position and strength of troops can often be drawn from the fire brought to bear upon cavalry patrols from certain points, or the concentration of large bodies.

It will seldom happen that so many or such voluminous and precise messages will be sent in the field as is the case at manœuvres. On the other hand, the commander will receive a number of imperfect, vague, and even wrong messages, out of which his intelligence will have to evolve the truth or probable truth. Information regarding the enemy should therefore not be given too precisely that commanders may learn to form a correct estimate of such communications. This important practical work can therefore be effectively practised at Kriegspiel, for the instructor can prepare a large number of messages of all kinds beforehand. It is for this reason more advisable for the instructor to personally supervise the details of reconnaissance, this feature being often introduced into the game. The instructor should also try to represent the factors, the condition and behaviour of the troops, etc.

I have already mentioned that the time actually employed in the field should be adhered to as far as possible when commanders are forming their plans. Whenever it becomes a matter of immediate action, such as cavalry charge, ambuscades, etc., etc., all words of command and orders should be given at once, any delay or indecision counting against a player.

In conclusion, I would like to say a few words on the matter of criticism or discussion following *after* the game.

All the main features of the game should be pointed out and all mistakes corrected.

It should not last too long or take the shape of dreary explanations. A criticism of the preliminaries should be partially confined to written remarks and only deal with matters of general importance. A detailed discussion and criticism of orders should only take place (and indeed this is a matter of vital importance) when their merits or defects are specially prominent throughout the game.

Discussions of a purely theoretical nature are quite out of place. In an object lesson only the practical side of the question, *i.e.*, the employment of principles to existing circumstance, should be entered

into. It will not suffice to merely point out the presence or absence of intelligent action, but it should be further shown in what other ways the game *might* have developed. Beyond this the instructor should hold to the golden rule (contained in paragraph 434 of the Field Service Regulations) of avoiding abrupt or severe censure which is sure to deprive the players of all pleasure or interest in the game. An instructor will do well if he leads up to the results of the game from both opponents' points of view, and then going back again follow the course of the game and inquire into the reasons which brought about those results. By showing what part each man took in the game and how far he contributed to the solution of the problem, criticism is thus self-delivered almost without names being given. This will be far better than any dictatorial laying down of certain views as absolutely correct. The amount of instruction obtained from the game will, if properly employed, assist the instructor himself, and if he can gain the confidence of his pupils, he will be certain to learn a great deal.

Kriegspiel should above all be treated more as a friendly meeting for instructional purposes than a strict military duty, and little trifling relaxations of service customs conceded by the senior officer present will be of inestimable value in maintaining this character.

Briefly reviewing the foregoing pages, then, we come to the conclusion that it merely requires the observance of a few simple principles to make Kriegspiel attractive—

Rapid play, free scope for independent action, and the imagination and conception of real practical situations.

It is for the reader now to test these principles and himself to extend and enlarge upon them. Although much of this paper contains what is well known and what are matters of common sense, the principles laid down are so important that I venture to hope their exposition may bear fruit. If instructors were to make these principles hard and fast rules, we should soon see what opportunities we were given in Kriegspiel of studying our regulations and tactical books, and our officers, instead of regarding the game with indifference or contempt, would take to it with the keenest pleasure and interest.

Translated from the

"Militär Wochenblatt"

by P. H.

THE NATIVE TROOPS OF VARIOUS EUROPEAN POWERS.

TRANSLATED FROM THE "REVUE DU CERCLE MILITAIRE" BY
"UN FANTASSIN."

Historical Introduction.

From the days of remote antiquity it has ever been the object of the conqueror to utilise the services of the vanquished. Quintus Curtius tells us that Alexander the Great, the conqueror of the Persians, raised a corps of volunteers, composed of young soldiers of that nation, and took such interest in their training and discipline as to excite the jealousy of the veterans of the Macedonian phalanx.

Although it was prescribed by law that every legionary must be a Roman citizen, Rome invariably employed, in all her foreign wars, especially in Africa, a number of special troops, recruited by voluntary enlistment in her tributary states, who contributed very largely to the success of the Imperial Arms.

A few centuries later, the Crusaders, after they had made themselves masters of the Holy Land, did not scruple, in spite of the fervent religious spirit with which they were imbued, to employ numbers of infidels in their armies.

In comparatively modern times, ever since Henry, the Navigator of Portugal, opened to Europe fresh outlets in unknown portions of the globe, the *conquistadores* of the new world made constant use of native auxiliaries, whose services proved most valuable.

Owing, however, to the fact that slavery in those days was not only tolerated but encouraged, natives were far more like soldier-servants to their European masters than regular auxiliary troops. It was a Frenchman, the celebrated Dupleix, who first made use of disciplined native troops in his armies, and who first discovered their military value. It cannot too often be repeated that intelligent application of this idea, which has built up an Eastern Empire for England, originated in the administrative genius of a Frenchman.

Since that time native troops have been employed everywhere and by all nations. The first battalion of Negro soldiers, in the service of France, was raised in Senegal in 1857. It was the nucleus of the two existing regiments of Soudanese and Senegalese Rifles. In Indo-China, just before the conquest of Cochin-China, the French formed a regiment of Annamite Rifles which served as a model for the subsequently raised rifle regiments of Tonquin.

Infantry.

The infantry in the colonies, even more perhaps than in Europe, may be justly described as the "queen of battles," and on account of its arduous duties, is organized in battalions, so as to ensure the highest degree of mobility.

In the British Indian Army the sepoys are organized in battalions of eight companies which are very improperly called regiments. The European staff of each corps consists of eight British officers, *viz.*, one commandant, two wing commanders, three wing officers, one adjutant, one quartermaster, and also a medical officer. The company officers are all natives, and each company consists of one captain (*subadar*), one lieutenant (*jemadar*), four sergeants (*havildars*), four corporals (*naiks*), two drummers, and 100 sepoys. The senior native captain has the rank of *subadar-major*. The British officers invariably take precedence over all native officers, whatever the rank or seniority of the latter.

In the Italian Colonial Army the native infantry of Erythrea consists of a number of battalions, each composed of four companies and commanded by a major, assisted by an adjutant. Each company has the following European staff:—one captain, two lieutenants, one quartermaster sergeant, with a few drill instructors. The native ranks comprise two sub-lieutenants (*jus-bachi*), eight sergeants (*buluk-bachi*), eight corporals (*muntez*), four buglers, and 180 soldiers (*askaris*) per company.

In the Spanish forces of the Philippines native troops are employed, but no native can rise to the commissioned grades unless trained at a military school in Spain. The tactical unit is the battalion of six companies. The officers, with the above exception, are Spaniards. The non-commissioned officers are partly European and partly native, and the soldiers (*tagals*) are all natives.

In Cuba and the West Indies the only local troops are a few battalions of volunteers and militia, each composed of four companies.

The Portuguese have no regular colonial army so far, as their finances do not permit of such a luxury. Their possessions in East Africa are administered by the powerful Mozambique Company which is empowered by charter to entertain forces by land and sea to ensure the security of the country. The Company is further obliged by its charter to establish at its own expense 1,000 families of Portuguese Colonists. The Portuguese Government, however, provides for the administration of justice and reserves to itself the right to establish military garrisons wherever considered desirable.

The regular troops, employed by the Company, consist of four mixed battalions, *i.e.*, corps composed partly of natives and partly of Europeans. But these units are not very strictly disciplined, and they will, in course of time, be replaced by 16 drilled independent companies of natives, officered and led by Europeans. Each company will consist of one captain, two lieutenants, two sub-lieutenants, one sergeant major, 11 sergeants, 24 corporals, from 184 to 240 native privates, five buglers, and an armourer. One of the subalterns, assisted by a sergeant, will perform all duties connected with supply and clothing. The first section of each company will be trained as artillerymen and to the use of machine guns. Company commanders will be mounted. In their recent operations against Gungahama, the Portuguese have employed regular troops from their home establishment, chiefly Marine infantry, supported by strong contingents of native irregular levies.

At the commencement of their colonial enterprises, the Germans were unwilling to send away to Africa the smallest detachment of

troops. They have now, however, in East Africa a native regiment, with a European staff seconded from the home army. The latter consists of one commandant, one second-in-command, 12 company commanders, 14 medical officers, and 76 non-commissioned officers. This corps consists of 12 companies which are practically independent, being widely scattered. Each company has an artillery section, with a few field and machine guns.

In the Russian Army the native troops of the Caucasus consist of a number of four company battalions (*droujines*), each with a staff of one colonel, one lieutenant colonel, four company commanders, and 11 lieutenants. Natives of good family often rise to very high rank in the army. Besides these regiments of Caucasian Chasseurs, there are a number of reserve battalions, each of four companies.

The army of the Dutch East Indies differs essentially from other colonial armies, in that it is the only one in which there are mixed units, composed partly of Europeans and partly of natives. The tactical unit of the infantry is the battalion, four companies, and it may be either a field, *depôt*, or garrison battalion.

Each field battalion, like a Roman Legion, is organized so as to be complete in itself. It generally consists of four companies, two of Europeans and two of natives, but some battalions have two companies of civilized Amboynese Christians in lieu of the Europeans. Each battalion has a small engineer equipment and often a few light field and machine guns. All the most fatiguing duties are performed by the natives, the Europeans being held in reserve. Each battalion includes one lieutenant colonel, or major commanding, one lieutenant and adjutant, four captains, 12 lieutenants, and 125 non-commissioned officers and men per company, who may be Europeans, Amboynese, or natives. In the Colonial army of Belgium, known as the forces of the Congo Free State, the tactical unit is the company. The total force, which consists of 16 companies, is spread over an immense extent of territory, with head-quarters at Boma, the capital of the State. Each company is divided into sections, one of which consists of artillery. On service, each company is reinforced by a contingent of auxiliaries, and is commanded by Belgian officers, who, under the title of Inspectors of the Congo Free State, have achieved most successful results in their incessant struggle with bands of Arab slave dealers.

The investigation of the native infantry of various nations shows us that the tactical unit is generally the battalion, composed of from four to eight companies. The French alone have regiments of 12, 16 and even 20 companies, which are organized as follows:—

- One regiment of Senegalese Rifles, consisting of 14 companies.
- One regiment of Soudanese Rifles, consisting of 16 companies.
- One battalion of Houssa Rifles, consisting of four companies.
- One independent company of Houssa serving in Dahomey.
- One regiment of Madagascar Rifles, consisting of eight companies.
- Four independent companies of Madagascar Rifles.
- One company of Sepoys.
- One regiment of Annamite Rifles, consisting of 12 companies.
- Two regiments of Tonkinese Rifles, consisting of 16 companies.
- One regiment of Tonkinese Rifles, consisting of 20 companies.

The French native regiment is commanded by a lieutenant colonel. The regimental staff comprises one captain or major as 2nd in command, a lieutenant who acts as paymaster, another who performs the duties of quartermaster, and a varying number of non-commissioned officers. Each battalion (of which there are three, four, and sometimes five in a regiment) is commanded by a major as commandant, who unfortunately has no adjutant to assist him as is the usual practice in the native battalions of foreign armies. Each company has a captain and two subalterns, and in the Senegalese Rifles there is also a native lieutenant. The officers in these regiments are assisted by the following European staff:—one sergeant major, one quartermaster sergeant, and from four to eight sergeants. In the Tonkinese and Malagasy Rifles there is a European sergeant major for each company, but in the Senegalese and Soudanese Tirailleurs, the duties of this official are performed by the native officers. The number of native soldiers varies from 125 to 250, and there are usually one sergeant and two corporals to every 25 men.

Cavalry.

The Russians and the English are the two nations which make the most use of their native cavalry. The Russians have a regiment recruited from the inhabitants of Daghestan, and on the vast steppes which extend from the Caspian to the Pamirs, make use of independent sotnias of Cossacks, recruited locally, which are found to be of the greatest use.

In India the native cavalry regiments each consist of four squadrons, with a total strength of one commandant, four squadron commanders, five squadron officers, one of whom is adjutant. These are all Europeans. There are, besides, eight native captains, eight native lieutenants, and a native adjutant, 66 non-commissioned officers, and 550 privates.

In the Dutch Colonial Army the cavalry unit is the squadron. All the officers are Europeans and the rank and file mixed, half the men being Europeans and half natives. Each squadron consists of one captain, four lieutenants, 10 sergeants, 10 corporals, and 64 troopers, all Europeans; besides these there are two sergeants, six corporals, and 62 troopers, who are natives.

The Italians have one squadron of native cavalry in Erythrea (Abyssinia). It consists of one captain, three lieutenants, four sergeants, and six corporals, who are Europeans, and 150 troopers, who are natives.

France, like Italy and Holland, has adopted the squadron as the tactical and administrative unit. Each consists of two European captains and four lieutenants, one native lieutenant, and rank and file, half European and half native.

Artillery.

The French, Spanish, and Portuguese only employ natives as drivers. The English employ natives as gunners, but in very limited numbers, and only in mountain batteries.

In the Dutch Colonial Army there are four mountain and four field batteries, composed half of Europeans and half of natives. Each battery consists of one captain, three lieutenants, 80 European, and 65 native soldiers.

The Germans in East Africa have a few light guns and machine guns, such as Maxims and Nordenfeldts, attached to each company of native infantry. The guns are actually laid by Europeans, but a few natives are employed to assist in working them.

In Abyssinia the Italians have mountain batteries of six guns, each worked by 150 native gunners. Each battery has a European staff of one captain, three lieutenants, eight non-commissioned officers, and three artificers.

In the Congo Free State each company of infantry includes one section of artillery. The guns are worked entirely by natives.

Engineers.

The English make more use of native engineers than any other European Power. They have, in India, three corps of sappers, *i.e.*, 25 companies of 125 men each, or a grand total of 3,125.

In the Dutch Colonial Army the field engineer companies consist of 300 Europeans and 200 natives.

The Italians have one company of engineers in their African Army, with an establishment of 140 Europeans and 60 natives.

France has no corps of colonial sappers, all engineer services abroad being performed by the marine artillery. It is proposed, however, to raise a few companies of native engineers for service in Tonkin and the French Soudan.

BICYCLIST CORPS.

The idea of "conveying" or "transporting" infantry is no modern one, the first proposal being to provide certain portions of the arm with carts, with a view of covering long distances as rapidly as possible. The difficulties of this in war time would, however, of course have been immense. Allowing even one cart for 25 men, the men alone of one battalion would require 40 carts and 160 horses. In Lehnert's handbook the number is given at 100 carts and 200 horses. The up-keep of these carts in peace time would be very costly, but a greater drawback than this would be the increased amount of train, and every one who knows what the long straggling columns of commissariat, pontoon, etc., transport means, will realize how impossible it would be to maintain such infantry corps as a permanent integral portion of the "ordre de bataille."

Now, however, that the bicycle has been introduced in the service, we are on a fair road to obtain an ideal corps of this nature. The only question is as to what extent we should employ them.

They should be tandems (for two, three or more men) or folding bicycles, for we must maintain that we are somewhat sceptical as to the practicability of employing bicyclist units successfully.

Any novelty of this kind is more eagerly adopted by the French than in any other army owing to the feverish desire to possess any perfect instrument of war and thus contribute to success in a future war. The French Army is therefore now in the experimental stage as regards infantry bicyclist corps, and time will show whether the idea will be followed up and whether others will follow suit.

In No. 2135 of the "L'Avenir Militaire" of 8th September, a long article is devoted to a detailed account of Captain Gérard's Bicyclist Company, during the late manœuvre of the 2nd Army Corps, with a view of proving how far a Bicyclist Company is superior to an equivalent number of cavalry. As the matter is one of great military interest, we reproduce one of the many reports quoted by the above newspaper:—

"The 2nd and 3rd September witnessed the triumph of Captain Gérard's Bicyclist Company."

Then comes the general idea for these days:—

The 45th Regiment, with two squadrons of the 2nd Hussars, is at Laon; the 87th Regiment marched from La Fere with two squadrons of the 4th Hussars, and the Bicyclist Company as advanced guard. The 87th Regiment is to force the Crépy defile; the 45th Regiment attacks the 87th.

Operations commence at 7 o'clock. To enable the advanced guard of the 87th to force the Crépy defile, and whilst the cavalry are reconnoitring the same, the Bicyclist Company receives orders to occupy the village of Bucy-les-Cerny on the right flank of the defile.

The company takes a muddy road from Fourdrain to Brie, then turns off, crosses a dense swamp, and reaches the foot of a steep

hill which has to be taken. The bicycles are folded up in an instant, and the men advance as infantry reaching a plateau and thence descending, through a copse, the slope of the hill. The bicycles are then opened out, and having overhauled the enemy, Bucy is occupied without a shot being fired. Information being received that the enemy are advancing on the road from Laon, Captain Gérard, who is awaiting the support of the 4th Hussars, leaves half a section in Bucy and advances with the remainder of the company to Crépy. Here the 2nd Hussars are forced to retire under the fire of the bicyclists, and eventually mass behind a small wood. The advanced guard of the 45th are decimated by the fire of the bicyclists, and whilst the 87th is on the march, Gérard's company tries to attack the enemy at another point on the left flank. Almost impossible tracks are followed; nothing stops them. Having crossed a field, they attack the 2nd Hussars, and then the 4th Hussars under Major Abonneau come up. Advancing under cover of an undulation, and supported by the bicyclists, the cavalry then attacks the enemy, who are repulsed. Major Abonneau and Captain Demange (deputed from the War Office) are astounded at the extraordinary success of this operation.

The 4th Hussars and the bicyclists carry out the pursuit as far as Cerny-les-Bucy, and a few minutes later appear on the Laon road, where they attack the 2nd Hussars, massed in a small wood to the right of the road.

The Hussars at first retire, but soon come into action dismounted. The Major does likewise, the line being prolonged by the bicyclists, and for the fourth time the cavalry, without bicyclists, are forced to retire by that with bicyclists.

The fight being now ended, the officers are called up to General Strohl, who points out to what an extent cavalry will have to reckon with this new "insaisissable" instrument of war.

The Bicyclist Company then proceeded to Chéry-les-Pouilly along a fearfully bad road. On 3rd September the Hussars and bicyclists leave Chéry-les-Pouilly at dawn, the latter proceeding quietly towards Laon along the road still muddy from the rain of the previous evening. Major Abonneau's squadrons reach Montsendu, whence, supported by Captain Gérard's carbineers, they are to harass the 45th representing the advance guard of an army advancing from Laon.

The general idea is as follows :—

Two armies are marching along the banks of the Serre, with flanking parties. The 45th finding the road from Laon blocked are to fence it and reach Chéry-les-Pouilly. At 5-30 A.M. the Bicyclist Company reach the Barenton brook ahead of the cavalry and crossed by a narrow log bridge. The bicycles are put together, and the men advance under cover towards the Hussar scouts, who are completely surprised and find the road blocked. They are pursued by Lieutenant Picard and his men, who creep along on all fours and attempt to take the cavalry prisoners.

On reaching the village of Barenton on the left of the road, the enemy's cavalry appears on the horizon, and thinking the road is clear, they march in close formation until brought to a standstill by the bicyclists' volleys at 600 metres from the brook.

After a moment's delay, and in spite of the impossibility of the operation, they charge and force the road. Captain Gérard and Major Abonneau are naturally furious. A message is sent to Colonels Lafitte and Rouze, who decide that the cavalry must be placed out of action. The bicyclists, supported by the dismounted Hussars, now repulse a company which has advanced to within 100 metres of the passage without replying to the fire of the bicyclists. The 87th gain touch with the 45th on either side of the road to Laon.

The bicyclists and the Hussars are now ordered to concentrate to the left of the 87th, while the cavalry advances on the right against the 45th. The Bicyclist Company follows them straight across ploughed fields in support, with their bicycles on their backs. The cease fire is sounded, and then the assembly; and whilst the infantry marches wearily along, the bicyclists, who have won the day from the 87th, march cheerily into Laon.

In commenting on the operations, General Strohl severely censured the enemy's Hussars.

Translated from the

"Deutsche Heeres Zeitung"

by P. H.

PIONEER BICYCLISTS AT THE GERMAN MANŒUVRES.

The German "Bicyclist's Association" writes as follows:—

During this year's manœuvres in Saxony and Schleswig, a complete detachment of bicyclists was employed for the first time. The detachment consisted of an officer and 30 men of the 12th Pioneer Battalion of the Saxon Cavalry Division.

Owing to the necessity of having pioneers attached to cavalry divisions for bridging, demolitions, etc., etc., the question remained to be solved as to how these detachments would be able to keep up with the cavalry. The idea of mounting the men had to be abandoned, because this entailed their being specially trained, and of course this was impossible. Finally, it was decided to move them in carts, but the disadvantages of this were obvious. The difficulties of rapid movement were enormous, to say nothing of the material and tools that had to be carried. It was therefore decided to make an experiment with a bicycle detachment during the Imperial manœuvres, the results of which have been satisfactory beyond all expectation. The detachment managed to follow and keep up with the cavalry over roads that were almost impassable for carts, and occasionally traversed stubble fields at a very slightly reduced speed.

The value attached to bicyclists by the military authorities was shown by their extensive employment as orderlies, etc., and as they proved themselves equal to their task on every occasion, there is every probability of their being employed still more extensively.

CAPTIVE BALLOONS AND BICYCLES.

The following report has been published with regard to experiments made with these two new inventions during the German Imperial manœuvres :—

Although we have not yet rivalled the "Huns," as described by Kaubach, with their warfare in mid air, the possibility of being able to watch an enemy's movements from a balloon is a factor which will have to be seriously considered in a future campaign.

Both during this and last year's manœuvres, two different kinds of captive balloons were employed, and it has now been definitely decided to introduce the so-called "dragon" as well as the ordinary round balloon.

The former is an invention of Lieutenant Von Siegsfeld of the 2nd Reserve Guard Lancers. When in the air it has the appearance of a huge sausage rising to a point on the upper side. The lower end is bent upwards, and there is a car suspended beneath the centre. Attached to it is a small round balloon.

This small balloon, the air bag (the bent up lower end of the sausage above mentioned), by keeping the balloon always in an oblique upright position against the wind, enables it and also the car to be kept steady in position even during a strong wind.

The tendency to rise and the pressure of the balloon acted on by the wind economise space and less gas is used. In calm weather these advantages disappear and the round balloon comes into use.

The question of decreasing the amount of carriage required, which is so desirable a matter, does not appear to be nearer its solution in the immediate future. Will still require, besides the cable and apparatus cart, six six-horse carts for gas; each balloon detachment thus requiring on service scale (two balloons) a total of 16 military carts.

As regards the supply of hydrogen, which is produced by the electrolytic system, Prussia has the great advantage of having a private firm at her disposal, which, my informant tells me, can supply any quantity of the gas at a moment's notice, cheaper and purer than the Government establishments, such as in Vienna, Munich, or Rome.

With the adoption of this balloon, the Ballooning department will have overcome a number of technical difficulties, whilst the commandant has practically solved the question of drill, etc.

The great difficulty now remaining is to keep the balloon moving when required, as, for instance, when the troops advance. A cable has however now been adopted, which is divided into ten lengths of 100 metres each. At every 100 metres there are guy ropes, which are looked after by 60 men. Thirty would really be sufficient, but the extra number are employed, as when crossing streams and other obstacles the ropes have to be released every now and then.

All messages will, as a rule, be sent down by telegraphy, but important information, plans, etc., are despatched in original in a bag. The officer in charge will also often report personally to the general commanding. This is advisable, not only on account of the great value of verbal reports, but because continuous work at that height (1,000 metres) is inadvisable and exhausting. As regards bicycles, my correspondent is of opinion that the ideal field bicycle, combining strength with minimum weight, has not yet been made. Both in France and Germany private bicycles are used. These are, however, mostly used for sporting purposes, and have never stood the real test of service, except for a fortnight during the manœuvres.

It has further been found that a machine costing 380 marks (£18), when used over country roads and in continuous bad weather and by riders with but little experience, soon required repairing, and that though these repairs were carried out by military artificers, they were very costly.

The military bicycle of the future will probably be made out of the aluminium alloy employed by David Schevary for his navigable balloon, but this composition is still the inventor's secret.

It is stated that both the bicyclist detachments and single bicyclists worked most satisfactorily throughout both this and last year's manœuvres.

Small parties of 50 men each were employed, mostly on reconnaissance work, but also occasionally as mounted infantry to seize an advanced position, such as the well known "Kreckwitzer" heights at "Hochkeich" on the Prussian line of retreat on 14th October 1758. On the day that the Emperor commanded the Eastern Army, communication was established between the head-quarters and the VI Army Corps commander, when everything worked excellently. Relays were laid at every two kilometres. Each relief man, as he saw the messenger approaching, mounted and started, taking the message while moving and then moving rapidly onwards. In this manner a distance of six kilometres ($3\frac{1}{2}$ miles) were covered in something under 15 minutes, which, considering the bad state of the roads, was a most creditable performance.

Translated from
"The Reichswehr"
by P. H.

A CONTRIVANCE FOR MEASURING DISTANCES.

By C. LUTTIG.

A new instrument has just left the Luttig workshops. Although the principle is identical with that of the present contrivance used by the Survey Department in combination with the plane table, its merit lies in its simplicity.

A telescope is fitted on a light stand and reads the distances on a rod which is carried with it. The reticle (or hair bars) in the telescope are so stretched that one can read, between the upper and lower horizontal hairs, as many half metres off the rod as the rod itself is hundreds of metres distant, and between the upper or lower and centre hairs as many half metres as the rod is double hundreds of metres distant.

The definition of the telescope is so clear that one can read 20ths of metres. Under the most favourable conditions therefore a distance of 1,600 metres could be estimated within 10 metres. On the other hand, the stand is so light (probably with the idea of making it more portable) that it is extremely difficult even in a light wind to exactly adjust the hairs even by holding the telescope lightly. Still with only moderately clear weather, a distance of 800 metres can be read within 10 metres and beyond that within 25 metres, which is quite sufficient for all practical purposes.

Owing to the excellence of the glasses and the careful adjustment of the hairs, the instrument is very expensive—160 marks,—but we are of opinion that any corps would do well to spend the money. It cannot be said that this price is exorbitant, taking into consideration that its advantages over all others are enormous, and that its adoption would eliminate a great deal of the present annoyance and difficulty experienced when judging distance in the field. It would be most useful at inspections, as it would be possible to estimate exactly how far practice in judging distance had been carried out by a comparison of the distances read by the attacking and defending forces.

For field firing, and more especially for examination of corps, the instrument will be particularly useful.

From the "Militär Wochenblatt."

Prize Essay Gold Medallists.

- 1872.....ROBERTS, Lieut.-Col. F. S., V.C., R.A.
 1873.....COLQUHOUN, Capt. J. A. S., R.A.
 1874.....COLQUHOUN, Capt. J. A. S., R.A.
 1879ST. JOHN, Maj. O. B. C., R.E.
 1880.....BARROW, Lieut. E. G., S.C.
 1882.....MASON, Lieut. A. H., R.E.
 1883.....COLLEN, Maj. E. H. H., S.C.
 1884.....BARROW, Capt. E. G., S.C.
 1887.....YATE, Lieut. A. C., S.C.
 1888.....MAUDE, Capt. F. N., R.E.
 YOUNG, Maj. G. F., S.C. (specially awarded a silver medal).
 1889.....DUFF, Capt. B., S.C.
 1890.....MAGUIRE, Capt. C. M., S.C.
 1891.....CARDEW, Lieut. F. G., S.C.
 1893.....BULLOCK, Maj. G. M., Devon. Regt.
 1894.....CARTER, Capt. F. C., Northumberland Fusiliers.
 1895.....NEVILLE, Lieut.-Col. J. P. C., S.C.
 1896.....BINGLEY, Capt. A. H., S.C.

MacGregor Memorial Silver Medallists.

- 1889.....BELL, Col. M. S., V.C., R.E. (specially awarded gold medal).
 1890.....YOUNGHUSBAND, Capt. F. E., K. Dn. Gds.
 1891.....SAWYER, Maj. H. A., S.C.
 1891.....RAMZAN KHAN, Havildar, 3rd Sikhs.
 1892.....VAUGHAN, Capt. H. B., S.C.
 1892.....JAGGAT SINGH, Havildar, 19th P. I.
 1893.....BOWER, Capt. H., S.C. (specially awarded a gold medal).
 1893.....FAZALDAD KHAN, Duffadar, 17th B. C.
 1894.....O'SULLIVAN, Maj. G. H. W., R.E.
 1894.....MULL SINGH, Sowar, 6th B. C.
 1895.....DAVIES, Capt., Oxfordshire Light Infy.
 1895.....GUNGA DYAL SINGH, Havildar, 2nd B. I.
 1896.....COCKERILL, Lieut. G. K., 28th P. I.
 1896.....GHULAM NABI, Private, Q. O. Corps of Guides.

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FROM LEH TO PEKING ACROSS TIBET.

BY CAPTAIN M. S. WELLBY, 18TH HUSSARS.

It may be as well to glance for a moment at the map of this wonderful country of Tibet, or Bodyul as it is called by the Tibetans themselves. It will be seen that it consists of one vast table-land, hemmed in on all sides by immense ranges of mountains, the highest in the world, covering an area equal to nearly four times that of France, and it forms the Northern Frontier of India from Burma to Kashmir.

In Southern Tibet we have the sources of most of the great rivers of India and China, and in consequence the greater portion of the population, which, in Tibet proper, is about four millions, is found here engaged with agricultural pursuits.

We read, too, how Bower, Littledale, and Prejevalsky met nomads in the pasture-lands of Central Tibet, but nothing was really known of Northern Tibet, which was supposed to be too bleak a land for any one to dwell in.

It will be remembered that in the year 1720 the Chinese conquered the country of Tibet, and the Imperial Residency was established at China. Lhasa, and Tibet, which formerly had been a protected State, became a dependency of China.

Some sixty years later the Goorkhas from Nepaul made a raid upon the rich monastery of Tashi Lumpo, and were afterwards punished by the Chinese for their uncalled for provocation. But this act

affected ourselves, for the Chinese, maintaining that we had prompted the Goorkhas, strictly prohibited the entry of all strangers into the country.

Before telling of our own journey, that is, of the journey that Mr. Malcolm of the 93rd Highlanders and myself made together, it may be of interest to speak briefly of former explorations in this fascinating land, and I mean to mention the expeditions made by Europeans only.

Our earliest information is when Friar Odoric traversed Central Tibet from China to India, spending some time in the Capital, Lhasa. Three whole centuries elapsed before another European is known to have entered the country, when a Jesuit missionary, starting from Agra, made his way to the sources of the Ganges and Sutlej traversing Western Tibet.

Other Jesuit missionaries visited the country and Lhasa, till in 1774 George Bogle was sent to Shigatse, which lies 200 miles west of Lhasa by Warren Hastings to open up trade with Tibet, and he would probably have been successful had it not been for the interference of the Chinese Agents at Lhasa.

Ten years later, Captain Turner was also sent on a diplomatic expedition by Warren Hastings to Shigatse.

In the early part of this century, Thomas Manning made his way to Lhasa and interviewed the Talai Lama, being the only Englishman who has done so.

The last Europeans to enter the Capital were the two French missionaries, Hue and Gabet, who, leaving the Koko Nor district in 1844, reached Lhasa two years later, and a few months afterwards were expelled by the Chinese Amban.

Since then, certain missionaries have been working on the outskirts of Tibet. And in 1876 and 1879 Colonel Prejevalsky attempted to reach Lhasa, starting from the Tsaidam.

In 1889 the Frenchman, Bonvalot, made a journey from the Lob Nor to Tengri Nor.

And two years later Major Hamilton Bower became the first to traverse the whole of Tibet from west to east without attempting to reach Lhasa, yet it will be seen he reached the neighbourhood of Tengri Nor. He paved the way for future travellers from this country. He would have reached Lhasa too had this been his object.

In 1888, 1891 and 1892 the American, Rockhill, travelled a great deal in Eastern Tibet, and owing to his knowledge of the languages, Chinese, Mongolian, and Tibetan, his books are interesting and valuable.

Rockhill.

In 1894 the Littledales, famous for their Central Asian trips and slaughter of the wild camel, made a determined effort to reach Lhasa.

Littledale.

Making a final start from Cherchen, they arrived within fifty miles of their destination, when the unfortunate sickness of Mrs. Littledale compelled them to return to India the quickest way they could.

A great deal of our knowledge of the country has been gained by the splendid idea of Colonel Montgomerie some thirty years ago, who launched forth trained native surveyors into the land.

Native surveyors.

It will be seen that none had attempted the exploration of Northern Tibet; certainly Littledale and Bonvalot had crossed from north to south on the east side, but there lay hundreds of miles untravoured. It seemed almost incredible to us that such should be the case, with the millions of people living around; and it made us all the more eager to find out why this portion of the globe had been forsaken.

We had heard speak much of the minerals in the land, and our imaginations fancied hills sparkling with diamonds and valleys covered with gold. Would that such had been the case!

Besides this, we aimed at discovering the source of the Chu Ma which is, so the Royal Geographical Society suppose, the northern tributary of the Upper Yangtse, known to the Mongols as the Nap-Chitai-ulen and is also called in Tibetan Ma Chu or Chu Ma.

Chu Ma.

Thirdly, we thought we might have opportunities of learning something of the weak administration of the Chinese Government.

Chinese Government.

We might have noticed a good deal more than we did, had not that nightmare "overstayed our leave" driven us across China, as

Leave.

though in a whirlwind.

In every expedition it always seems to me to be one of the hardest jobs "to gauge the strength of the transport," and in my idea, for a

Transport.

journey of peace, the smallest number of men and animals that one can manage with will ensure the greatest success; and ours being such a one, we followed this axiom; not that we

did not carry fire-arms for the same reason that some missionaries carry loaded pistols. We made our start from Leh.

Our transport consisted of mules and ponies. Our men were mostly Argoons. The son of a Turkistan merchant, with a Ladakhi mother, is an Argoon.

A single Argoon would not undertake to look after more than four mules or five ponies.

We carried bhusa and grain for our animals and four and a half months' rations for the men, that we might have a feeling of independence, should we meet with some unforeseen reverse.

We found, when we began to calculate, that the more animals we might get the more men would be required, and consequently more food would have to be carried, and so again more animals to carry the food. We found our number of mules was running into scores. Our minds, however, were set at rest by the very fact that we could not get more than 22 mules and 17 ponies, and some of these latter were in very poor condition.

Our followers consisted of six Argoon and two Yarkandi drivers, an Argoon cook and a Ladakhi servant, and, lastly, our persevering Sub-Surveyor, Duffadar Shahzad Mir, XIth Bengal Cavalry.

At this time of the year, namely, the beginning of May, most of the passes were closed, so that we could not take the direct route across the Chang La to Lanak La, for that was where we wished to cross the frontier. The only way open to us was to work our way to Shushal on the Pangong Lake. We sent our caravan on ahead by slow stages, so that we might make a fair start from that point, and we ourselves came on afterwards on hired animals post haste, leaving Leh on the 4th May.

I shall never forget the departure of our caravan from Leh. As soon as the loaded animals were let loose from the serai, they tore down the main street, some rushed into alleys, others discarded their loads, while men shouted, dogs barked, women and children fled, etc.

When clear of the bazar, a large crowd followed, but a short distance outside the road makes a sudden dip, and the crowd, fearing the return journey, said their last farewells with much weeping, and some of the more generous-hearted of the muleteers scattered small change to the young fry.

At Shushal our difficulties began, as no one could or rather would volunteer any information about a road going east.

Shushal.

We knew we could not go *via* Rudok, for a large guard is always maintained there to stop foreigners taking this main road to Lhasa.

Rudok.

Looking at the map, it seemed as though we might steer between the two lakes, so we sent a couple of our men to find out. But before going very far they were stopped by the Rudok men, who were well acquainted with our every movement, and who advised us not to come that way or there would be trouble.

Thus there was only one way left for us, namely, to follow the lake to Ludhkong and strike east from there.*

This was a two days' journey, and on the way we overtook our flock of sheep, terrible shock to us, for with a day's start they had only gone a few miles, and some were being carried. This was the entire reserve of our commissariat.

Sheep.

At Ludhkong, the headman was a very obliging and sensible fellow, for he agreed to let us have some sheep and goats in exchange for ours, which might some day reach Ludhkong!

Ludhkong.

This was the last place where we could get any more supplies.

On the 14th May we left Ludhkong for Niagzu, two days without water, but with the assistance of hired yak we reached this place without mishap.

At Niagzu there is a stream and thick brushwood, the last we were to see for another four months.

Niagzu.

Hares were plentiful, while antelope and kiang resided in some of the valleys. From there we journeyed for some days east, past the salt lake of Treb, thence a long pull over the Napu La, a pass which we made out to be nearly 18,500 feet high.

On descending some distance the other side we found a fine glacier and camped at the foot of it.

At this point our hired transport left us, and ever after we only had ourselves to depend upon.

Hired transport leaves us.

We found a broad, well-watered valley running east, and whilst marching down this, we overtook two or three Tibetans and won their

Overtake Tibetans.

* The direct route over the Marsemik La to the frontier was closed.

friendship by means of presents. They told us that if we went much further we should come to the district called Rundore, where our further advance would certainly be opposed. They wondered how we had managed to come so far, but accounted for it by saying that many Rundore men had been summoned to Rudok, where they had heard expeditions were coming starting from Leh. They agreed to take us up a valley to our left, which would take us to Mangtza Chu, and thus avoid these Rundore men.

News, however, of our movements must have reached

Rundore officials.

Rundore, for at our first camp up this valley we were visited by some Rundore officials, with an armed following. They had come to stop us, and just as we were congratulating ourselves on having persuaded them to let us pass, some officials from Rudok rode in in hot haste, and no kind of argument could change their determination that we must go back by the way we had come. All through the night we heard more men arriving, and the jingling of the bells on their ponies' necks announced at what a rapid rate they were riding.

At daybreak we found a small army, with matchlock and spear, drawn up behind a stone wall to oppose our advance.

Although we loaded up our mules and made an attempt at an advance, we were soon surrounded, and our mules would have been scattered to Jericho had we decided to fight. Our own muleteers, though armed with our sporting rifles and guns, were decidedly not for fighting.

It ended in our going back by the way we had come, and we had a second time to cross the Napu La, the very pass we had hired yak, only with much difficulty, to help us over; now unaided we were about to recross it by ourselves. Then we had to travel north along the eastern edge of Lake Treb to Lanak La, four Rundore men being sent with us as guides. On waking up the next morning at Lanak La, we found our four Rundore men had made off.

We were thus free to go wherever we chose, and we determined to strike east again, and, when baffled by natural obstacles, to travel north rather than south.

Since leaving Leh we had travelled 397 miles, two of our ponies had died from exhaustion, and all our sheep but one; yet we were only just on the border of Tibet.

Our men too had already proved themselves to be an indolent and untrustworthy lot of fellows, and were grumbling and hinting at turning back. Fortunately, Malcolm shot a yak,

and their minds were for the time occupied in eating this. Any sportsman anxious to shoot yak should pop over the Lanak La and will see any amount of them if he sees the same number that we did.

On 31st May, we launched forth over the "Chang," the unexplored portion of Tibet. I have been asked how did we find our way. At Lanak La, we had hoped to find the Polu road or Bower's route, but being unable to make out either, we followed up the nullah we had camped in, which took us to the top of an easy pass, and of course we had to descend again the other side, when we found ourselves in a broad valley running east. What could be simpler than to follow this? On some occasions we would suddenly find ourselves in front of a lake and would have to make a detour round, or on others an impassable range of hills compelled us to work round them. Generally speaking, our road for the most part lay down broad open valleys, lying over 16,000 feet high; these would continue for four or five days, when we would cross over an easy pass into another wide valley. The ranges of mountains luckily ran east and west, making travelling easier, I should think, than if we had been going north to south.

June.—During the month of June, we passed through a region somewhat dreary, though by no means depressing; salt lakes abounded and fresh water was scarce—in fact, almost every day we had to dig three or four feet for water. We used to make a shallow trough in the sand, and place a waterproof sheet over it, then fill it with water from the holes we had dug, and so water the animals.

Vegetation. Vegetation too was scanty, so that our animals died at an alarming rate.

By the 22nd of June, we had only 16 left, 23 had died; and some of the 16 did not look as though they would march very much further.

We had expected to suffer terribly from cold by day and night, so we were astonished to find the maximum register 110° in the sun, while at night the minimum showed sometimes 25° of frost.

Weather.

This heat in the day time was a high trial for our mules, so that we used to rise at 3-30 A.M., load up, and march half a dozen miles, making a second march in the afternoon.

Game during this month was scarce, but in July things improved; game became more plentiful, especially yak, some of which on one

Game.

occasion were grazing with our own mules.

Salt lakes became rarer, and there was more grass, and we made some strides with our collection of flowers. In fact, during the month of July we only lost four more animals; but at the same time we had lost two of our men, one from sickness and the other by accident, who had been shot by one of the muleteers.

The muleteers had proved themselves a bad lot of men from the very start, so much so that we could never trust them out of our sight, and their laziness was only surpassed by their avarice, for they would undo and eat up their food during the night, and would not live on half rations like ourselves. Consequently, on the morning of 2nd August, things reached a climax, when they went off in a body, taking the remaining 20 lbs. of flour, headed by the caravanbashi, Ghulam Rassul, who, having been with Mr. Littledale on his last journey, had deluded the others with the idea that he could guide them to Lhasa.

On the 2nd August, we were then left with Shahzad Mir, one cook and servant and 12 animals (*vide* map and plan). Loading mules properly is not easy, but we buckled to and made a long march that day, etc., etc.

Two days afterwards, whilst loading up in the early dawn, the deserters appeared. They had had enough of finding their way to Lhasa and entreated us to take them on again; but nothing would induce us to, with the exception that we took one man to help us in collecting droppings for our fire, in fetching water, and picketting the mules at night. As long as the muleteers followed us, we had to watch day and night against robbery.

As soon as we had shaken them off, things went smoother. Our three men worked with a will, the mules grew stronger, game was plentiful, and wild onions were abundant.

10th August.—At length, on the 10th August, when camped at the top of a high pass (*vide* map), where, through the exhaustion of the animals we were forced to halt, we met with a terrible misfortune, for during the night the animals that must have eaten some poison, all died, with the exception of three mules. Everything we could possibly do without had now to be abandoned—in fact, we only kept one very small tent, blankets and bedding, our ammunition and our instruments and the clothes we wore.

We commenced the descent of the pass a sadly reduced party.

The weather, which had hitherto been all that could be desired, was now very broken, the going was very heavy, and with our overloaded animals* marches had to be shortened. Whereas we had latterly been doing 16 miles a day, we now had difficulty in covering half that distance; to add to our troubles, game became very scarce, and for three days the men lived on nothing but tea.

Since the scene of our misfortune, we had been following a stream, daily increasing in volume, and we could not help thinking that this stream must take us on to some habitations, for we longed to see somebody and get help. Our daily food was kiang and wild onions.

For ten days we followed this stream crossing and re-crossing, the whole three mules often collapsing mid-stream, which flowed fast and cold, and about three feet deep.

20th August.—On the 20th August this stream brought us to the shore of a magnificent fresh-water lake.

Lake.

Everywhere grew rich green grass. On the north side of the lake, along which our path lay, rose grassy hills swarming with wild yak and kiang, while on the south side a vast plain stretched far away to distant mountains. Flowers, water-fowl, and hares were plentiful. Around the edges of the lake lay scores of perfect skeletons of dead yak. All seemed to come to die on the shores of this wonderful lake. The shore was sandy with rocks around, reminding one vividly of an inlet sea.

Although nearly 16,000 feet high, at 7 P.M. the temperature was nearly 50°, and during the night it only just froze.

Temperature.

At the eastern corner of the lake we found another tiny stream taking its rise from the hills during our march of the 26th August.

We found the stream growing larger, and could not help thinking that this must bring us out amongst some people, and we decided to stick to it until it did. By doing so, we felt we should always have plenty of water at any rate. As to food, we had even run out of salt, and when we shot a yak, we used to boil down its fat into cakes and munch it like cocoanut rock or Everton toffee.

The rivulet had grown into so important a looking river that we dare not have crossed it.

6th September.—On the 6th September we spotted, for we were ever on the look-out, a long way down the river, but on the other side,

Tibetan encampment.

what at first we took to be merely irregularities of the ground, then to be some stone houses, but lastly we made it out to be a large encampment. There were some twenty white tents of all sizes and shapes, while from one a flag was flowing. We were puzzled and excited, and could come to no solution as to who they possibly could be.

We sent our two men across to reconnoitre, armed with rifles, and pitching our camp in a hollow well out of sight, watched and waited the turn affairs would take.

Night came on and the men had not returned. But what astonished us still more was that, at daybreak the following morning, on mounting the rocks which we called our battlements to watch, there was no camp at all; it had vanished.

It was like a dream to us; but where were our men?

We decided to wait a day for them, and if they did not turn up, to still follow the stream. About noon, to our surprise, we saw them coming up stream, on the same bank as ourselves. About noon by their beaming faces and brisk step we felt at once they had good news for us.

Such was the case.

The camp turned out to be a body of Tibetan merchants on their way from Lhasa to China, and had we been a day earlier or later, we should have missed seeing them.

Since leaving Lanak La we had been marching three months and a week, and had covered 986 miles without seeing the sign of any body.

These merchants were marching at right angles to our course and had crossed the river.

We followed in their tracks and caught them up in three days' time, received hospitality and bought food, but at starvation prices.

A few words about this Tibetan caravan may be interesting.

Its general management and internal economy was wonderful to watch.

The head of the caravan was a very fine-looking Tibetan from Lhasa, well over six feet high, and well built.

He was known as the "Kushok,"* and no one, even if they knew it, would disclose his real name.

"Kushok" is a term of respect or affection. Living in the same tent with him was another big merchant.

There were also several minor ones, who owned only a few yak, and there was a Lama, or priest.

Altogether they made up an imposing caravan of 1,500 yak and some two or three hundred ponies, and to every 60 yak was a herdsman.

Every man as well as cooks and servants were mounted, so that on the march they presented a striking contrast to our sadly reduced little party.

The 1,500 yak were divided into seven distinct companies moving off in column. And these seven were again divided into two wings, with a considerable distance between them.

They always marched off in the same order without the slightest noise or confusion.

From the moment the watchman aroused the sleeping camp till the moment they marched off, scarcely a voice was heard. They moved off long before sunrise, the animals being loaded in the dark with their merchandise, which was chiefly composed of pulo cloth.

We used to pitch our camp near the "Kushoks" and sometimes the whole caravan had moved off without even waking us up.

By marching after this caravan we were able to carry out our sketching and observations without arousing suspicion. One day, on seeing Shahzad Mir come in last, carrying the plane-table, the merchants asked why was he made to stop behind and carry this board? What offence had he done to be thus punished? They were thinking of the punishment the Chinese inflict of carrying the wooden collar.

Not having seen any other people for so long, we had grown careless about our things and used to leave our guns and ammunition lying about, yet never was a single article touched by any one in the Kushoks camp.

We used to follow in their tracks till we reached their new encampment, which always looked as though it had been there for months.

All the yak were out grazing on the mountain side.

No food was ever eaten in the caravan till after the march and after the yak had been unloaded.

Each man was provided with a leather bag holding about 40 lbs. of tsampa, or twenty days' rations.

Rations in Tibetan camp. This was filled up for him by the cook, and he could eat it as he pleased, but he would receive no more for twenty days.

The cook brewed tea for all the servants in a huge cauldron, and when ready gave a peculiar cry, when all came round the fire bringing his own tsampa and butter or cheese. Their bowls appearing from the ample folds of their sheep skins were always licked perfectly clean after the meal before being replaced, etc., etc.

When the Kushok would have us, we used to sit in his tent, drinking tea and tsampa with him, chatting on various topics. And when he grew niggard of his hospitality, we used to pay him a rupee to come to tea with him, but in reality to talk with him.

Great was our joy on our first night's chat, when he informed us that the river, where we had first seen him, was the Chu Ma, the very one we were after, and whose source we had actually found.

All this time our rupees were coming to an end and the prices of food had been raised, and the merchant would lend us nothing, not even a yak to help us, nor even a pair of bellows to blow up our fire; but one fine day, when he was most anxious to borrow our little frying-pan, we said no, unless you lend us your bellows, etc.

Both sides became very childish, and one morning on the banks of the Shuga Gol we left the merchants, to find our own way into the Tsaidam.

Thus, on the 16th September, we found ourselves once more alone on the march. We crossed over the Burhan Bota range by the Namoran Pass, and then commenced a long descent, following the Namoran river. Each day we thought to have done with the mountains and to find ourselves in the open plains of the Tsaidam, for we longed for lower altitudes.

As we descended, we came to brushwood, the first since Niagzu, by the waters edge, and before coming out of the gorge we actually found a small stone square building; inside was a prayer wheel turned by the force of the stream, and around and about were prayers hanging from the trees, the largest one of which I stole.

We afterwards entered a desert plain and had only a bit of kiang's meat left.

Still we followed the Namoran stream, which eventually led us to some Mongols who were living in the bush, from whom we received every kindness and hospitality. I remember the first night eating myself a leg, shoulder and neck of mutton. Then I began to think how greedy they will think Englishmen are, so refused their pressing invitations to accept more.

They took us two days off to their tents, where we lived three days, trying to come to an agreement, whereby they would take us to China, to the town of Sining, where we expected to find missionaries. Finally, four of them agreed to come with us,

lending us five ponies for ourselves and five for our baggage, themselves also being mounted as far as the Chinese frontier, another 300 miles, trusting in us to pay them on arrival there.

Two of them carried guns and another a long spear, for they much feared the Bana tribes, through whom we were about to pass. So much so did they fear them, that if both Malcolm and I went ahead or hung back, they threatened to return at once. They said the Bana men hid behind rocks and took one by surprise.

At night time, too, they would rehearse, pretending that they were attacked, and would shout and fire off their guns at imaginary enemies. They wanted to accustom their ponies to a night attack.

Before reaching the Koko Nor we came to our first village, Tuling Gumpa. Close by here, two years ago, a Frenchman had been killed by these Bana men.

At sunset the Mongols took every precaution, the ponies were picketted in our midst, and fires were kept up throughout the night.

We came to the spot where some Chinese soldiers had camped in their pursuit of the Mahomedans who had recently rebelled against the Chinese, and who had only just lately fled into Turkistan.

Along the shores of the Koko Nor were dotted the black tents of the Bana tribes, and daily we overtook hundreds of yak laden with wool or salt on their way to China.

In the middle of October we reached the town of Tankar on the Chinese border, but were penniless. Since leaving Leh we had journeyed nearly 1,000 miles, and had been for nearly four months at a height of about 16,000 feet above the sea level. At Tankar we found a mixed crowd, chiefly Chinese, but Mongols and Tibetans too—a population of 10,000. The Tankarites gazed and wondered where I had sprung from. I had ridden on ahead with Esau, till at length a Chinaman told me that there was a missionary living in this out-of-the-world spot. This missionary, Mr. Rijnhart, was a Dutchman and his wife a Canadian. They were living in a small house in every way like Chinese, and as he spoke a little Tibetan and Mongolian and Chinese perfectly, he was most entertaining. The Lhasa officials, who lived at Tankar to see that justice was done to Tibetans at Tankar, used to come to tea in the house as well as the Chinese Colonel, or Hsieht'ai, and the Ting or Mayor, and all the Chinese officials of Tankar treated us with every civility and hospitality. From Tankar, our Mongols took

our baggage to Sining, while we rode with Mr. Rijnhart to see the famous monastery of Kumbum, which lies about 70 li south-east of Tankar. Mr. Rijnhart had spent many months in this monastery and was friends with a very large number of its inmates—more especially with Mina Fuyeh, one of the most incarnate saints in the place, and in whose house we were to spend the night.

Just outside the gate of Tankar we passed a party of Tibetans, in the midst of whom was a big living Buddha, who had recently been appointed abbot of the monastery of Ta Kœ Ri by the Talai Lama. On his way from Lhasa he had been attacked by a party of Mahomedans, all his attendants had been killed, and he alone had escaped to the mountains, where he wandered about for twenty-three days without food before he found his way to Tankar.

Everywhere on the road to Kumbum we saw the results of the recent rebellion; every village that was not in ruins had loopholed walls, and fighting towers had been erected.

Our companion, Mr. Rijnhart, had spent some time in General Wey's camp, who had been sent from Hunan to quell the rebellion, and pointed out the scenes of skirmishes or of serious fighting. People were just beginning to return to their fields, but two years will elapse before they will recover from the trying times.

The moon was high in the heavens when we reached our destination.

Our continual knocking at the great wooden gates of the monastery sounded loud in the still frosty night air, but at length they were opened by one of the great man's servants, who, on seeing Mr. Rijnhart, was all civility.

While word was being taken to Mina Fuyeh, we busied ourselves with our horses, loosening their girths and getting straw.

Soon afterwards we mounted the stone stairs, and after crossing an open court were ushered into the presence of one of the holiest men in the eastern border of Tibet.

Mina Fuyeh is 27 years of age, and has been in the monastery since he was seven, with a very pleasant face, especially when lit up by a happy smile, as it often is.

We were soon seated, and he told us food would soon be prepared.

Mina Fuyeh is now in his sixteenth life time. Of course we were somewhat diffident about asking a perfect stranger

about his religious tenets, still he related how he became to be recognised as the reincarnation of the previous Mina Fuyeh. How, when very small, various articles were laid out, from which to select those which had been used in his previous

life; amongst these were the rosaries. Rosaries. "Oh," he says, "I had used it daily for

years; how is it possible that I should not know it?" He thus became the heir to the accumulated property of fifteen life times.

He talks freely of his last life time, pointing out the site of the house in which he lived and which was burnt down about two years before his death.

Mina Fuyeh had been till lately abbot of the monastery, the principal official, had come to an untimely end through a quarrel with another influential Buddha, Shertoch Fuyeh, as to whether they ought to go out and fight the Mahomedans, etc., etc.

Whilst chatting away, our food arrived—boiled mutton and tea, a large dish for the three of us and a separate smaller one for the Buddha.

We were hungry after our ride and were soon eating, Tibetan fashion, etc.

When we had eaten our fill, we rose to say good night, apologising for having thrust ourselves upon him without due notice. To this he replied, he was delighted to see us, he hoped we would look over all the place, etc., and take photos. of whatever we wished. Next morning we were up betimes, roused by the big horn that sounded for the 4,000 priests to prepare for prayer.

Early as we were, our host was before us making preparations for breakfast. He explained that his steward and several servants were away. It seemed strange to see an incarnate saint, who is held in the deepest reverence and worshipped by men, busy unlocking drawers, producing sugar and butter, and attending to trivial and mundane matters.

We were thankful, however, that he did, for our breakfast of tea and tsampa was soon ready.

Mr. Rijnhart is of course an adept at mixing up the butter, meal and salt or sugar into the correct dough, but we were not yet skilled in this art. For some time our host waited silently, smiling at our awkwardness, and at last offered to do it for us, adding hastily to Rijnhart "Please tell them my hands are quite clean."

We were soon visiting all the temples and shrines of the monastery, the most famous of which is the gold tiled temple of

Tsong K'aba. In the fourteenth century Tsong K'aba appeared as a reformer and purifier of the Buddhist religion. He founded what is known as the "Yellow Sect," and, instead of in red, clothed the priests in yellow garments. Now again they have reverted to the red cloak although they still wear the yellow hat.

Not far from this temple is the original "Sacred Tree," which sprung, according to some, from Tsong K'aba's hair, and, according to others, from his swaddling clothes. Whichever is right, the fact still remains that a true believer can see images of the saint on each leaf. Mina Fuyeh says the figure may be seen on some leaves, but as only a firm believer can trace anything, the question is doubtful, in spite of Huc asserting that he detected images.

Chief amongst the private dwelling-houses is that of A-Chia-Fuyeh, who is the first Buddha of the Empire. Just before he died, the Emperor promised him that, if on his return to life he would repeat all the conversations they had had in his then life time, he would make him the first Buddha in the Empire. There was of course no difficulty, and the promise was fulfilled. A-Chia-Fuyeh now lives almost entirely at Peking in the presence of the Emperor.

Before leaving Mina Fuyeh, he gave us each a photograph of himself, taken by Mr. Rijnhart and in return we promised to send him ours. We asked him if he would like anything else besides. "No," he said, "only some flower seeds." When it came time to depart, although we had seen a lot, but only enough to make us feel how much more there was to see and learn, we were full of regrets at having to leave.

To converse with a man like Mina Fuyeh, so versed in all the tenets and scriptures of the Buddhist religion, yet liberal-minded enough to talk about them, is rare indeed. He reconciled our two religions by saying that Tsong K'aba must have been an incarnation of Jesus Christ, and that, though in different ways and details, we still worshipped the same Divinity.

We rode on hard from Kumbum on our Mongol ponies and only reached Sining just before the gates closed. All Chinese towns close their gates at sunset. On the way we passed a small temple of Pank'ou, who was, according to Chinese mythology, the only man on the sun.

He knocked off bits which formed the moon, stars and planets and then jumped off himself on to the earth, where

his hair became grass and his other features corresponding parts of the earth's surface.

All the way to Sining were the same results to be seen from the Mahomedan rebellion as we had seen from Tankar.

This town had been the centre of the late Mahomedan rebellion. At the city gates were hung up in cages the heads of the ring-leaders, beheaded by orders of the Government after the Chinese soldiers had defeated the rebels, not before 40,000 Chinese had been slain.

The eastern suburb, or Tungkuan, formerly the home of 10,000 Mahomedans, was a scene of absolute ruination.

The town was filled with horse and foot soldiers who had not yet gone away. With regard to this recent Mahomedan rebellion in the province of Kansu, although there had been two previous rebellions, the second only twenty years ago, still there were no means at hand to cope with the insurgents. The "Salar" Mahomedans were known to the officials to be a restless and fanatical sect, and their religious enthusiasm affected their less turbulent and more numerous co-religionists. The Mahomedans are more enterprising, for, although comprising only one-fourth of the population of Kansu, still the greater part of the wealth was in their hands. But the Chinese Government, knowing this, kept no force at Sining, or at Lancheo, the Capital of Kansu. Sining was cut off for two months from communications till soldiers from the Japanese War came to relieve the place. The Mahomedans are better material to make soldiers from than the genuine Chinese. When the Chinese got the upper hand, they took violent and vindictive measures; many were beheaded, and the rest fled towards Turkistan, pursued by the Chinese.

They probably perished, as no news of their arrival had reached Peking in December 1896.

The effect of the rebellion on the district was very severe; trade was at a standstill, and the agricultural classes were unable to attend to their business; in consequence, supplies became very dear.

It will be two years before the district recovers its normal state. Ruined villages on all sides gave evidence of the troublous times the country had passed through.

Here, again, the strange lack of foresight which characterises Chinese Government is apparent: all soldiers are being removed regardless of consequences.

The Mahomedans will again increase from a new generation and a repetition of the troubles may be expected.

There are many armies in China ; each General has his own soldiers. As long as this state of affairs continues, no general system can be established, and the country will always be in danger of disturbances such as the last, which cannot be suppressed without a terrible amount of bloodshed.

Another 150 miles, five days or so, brought us into Lancheo, the Capital of Kansu.

We rode mules, most uncomfortable, etc.

Mr. Ridley of the C. I. M. and Mr. Rijnhart accompanied us. As we passed through the villages, we bought great lumps of " momo, " bread, or " kuarmian," vermicelli.

The more noise one makes sucking this in with the chop sticks, the better manners it is.

At night time we would find an inn, merely four mud walls, with a " kang," or raised platform, underneath which a fire is lit. More kuarmian, more noise, and tea.

In some places they grew cotton. The soil was like the stony beach of the sea shore and we pitied the donkeys that ploughed this soil.

Anxious to reach Lancheo before nightfall, we found a little raft, six feet square, consisting of some thin bamboos tied across some bladders. Mr. Rijnhart and self and the two boatmen embarked on this frail craft and were carried down at a rapid rate by the current, in some places the rapids hissing around us. All the time the bladders grew smaller and had to be reinflated every five minutes.

In spite of our venture, we were just too late that night, and spent the night in the Sikuan, or west suburb, sleeping next to an opium-smoker. More missionaries took us in here and arranged for carts to take us to Chungwei, eight days' journey. Cart travelling in China is no fun. Two mules are driven tandem, and only walk ; there are no springs. We used to cover sometimes over 40 miles a day. We travelled along the Imperial Road, and a Chinaman will tell you there is no road like it in the whole world ; yet you could not drive your trap or even a rickshaw along it. Shahzad Mir's opinion of the Chinese was summed up by saying that all the men were rotten from opium and all the women were lame, referring to their small feet, etc. At most Chinese towns is a Taoist temple, for the bulk of the Chinese are Taoists, the scholars being Confucianists. Opposite these temples is the village theatre, the play going on by day, the onlookers standing. We stopped once to watch the play, but unfortunately upset the performance, for the players stopped to watch us.

The Swede missionaries are in this part of China. At one town we called to see them, a man and wife. The missionary could speak but little English, for he went aside and began turning over the leaves of an English dictionary, and then asked "Have you come to make war?" Although surprised we knew what he alluded to. These good missionaries from Sweden had been greatly upset by Mr. Littledale, who, with best intentions, had complained against what he called the wholesale system of sending unmarried lady missionaries to the country without proper protection, and he feared we would raise the cry as well. From what we learnt from these open-hearted Swedes and the English missionaries, I feel quite sure that Mr. Littledale was hasty in his conclusions, though well meaning in his intentions. When we saw where, and the class of people amongst whom, these good missionaries lived, and became aware of what a self-sacrificing life they were leading and how severe their trials must be, yet how patient and hopeful against such odds they were, we were filled with admiration for them.

After waiting three days at Chungwei, where, in our small inn we were besieged all day long by a Chinese crowd, we took a flat-bottomed wool boat and floated down the Yellow River, nine days to Paot'eo, where again the Swede missionaries gave us every assistance. Another fourteen days' cart travelling brought us to the Celestial Capital. In some places the Great Wall disappointed us by the dilapidated state it was in.

On arrival at Peking, in spite of our worn-out clothes, dirt, and beards, we were received by Sir Claude and Lady MacDonald with the kindest and most genuine hospitality imaginable. From Peking to Tientsin is a good 80 miles by road, and it was dark when we arrived.

Unfortunately in the middle of the city our mule-drivers upset a water-cart and were promptly seized and taken to prison, while we had to turn drivers and find our own way.

We reached the Globe Hotel, but the Manager at first maintained there was absolutely no room. But we were so persistent that at length he consented to give us a tiny one between the two of us. The following morning, on his learning who we were, he apologised most profusely, for he said our appearance made him think we were robbers, and he feared to let us in.

This made us doubly appreciate the hospitality of the MacDonalds, for we fancied when we left Peking we had made ourselves pretty smart.

It was now the 3rd December, and winter was setting in. No time could be lost; we took the only train in China there is on to Taku, a two hours' journey, roasting chestnuts all the way in the guard's van—the only respect in which the Chinese railway excels our own.

We managed to get on a lighter and afterwards on to the S.S. *Nanchang*.

The following morning we found our boat surrounded with drifting ice. Winter had set in with a vengeance. The captain of the boat narrated how he had been frozen in for months, and what a glorious time they had, walking over the sea to Taku, and he hoped for it a second time. We, however, looked at it in a different light; we were anxious to get back to India, and watched eagerly for the last cargo of bones to be carried on board.

Shahzad Mir, Esau, and Lussoo, who had alone stuck to us, had ever talked of the big boat, for the two latter had never seen one. They pictured nothing but sleep, eat, and smoke. But after one night at sea the cigars we had given them lay scattered around: they experienced for the first time "sea-sickness."

They longed to be back even by the most dreary salt lake on the Chang.

We pitied them sincerely, for we can never forget the faithfulness, the willingness, of these three men, without whose ready support and assistance we should never have reached our journey's end.

Shahzad Mir deserves the greatest credit and reward for the determined and persevering way in which, through thick and thin, under all circumstances, he stuck to his plane-table work.

To part with three men of this stamp was perhaps the hardest task we had to overcome.

My regret is that Malcolm is not here this afternoon, for he could have really interested you. The good and the bad we have shared alike, but I can't help reflecting that without his friendship, his shrewd judgment, and sterling qualities this journey would not have been accomplished.

The Commander-in-Chief having invited a discussion, Major-General Sir Edwin Collen rose and said:—"At these meetings there is sometimes a little difficulty in inducing members of this Institution to rise and discuss the subject of the lecture, and if I venture to offer a

few observations you will understand that I do so in the hope that some one will follow me, and more especially a gallant explorer who is present and whose name has been referred to in the lecture. There are two matters upon which the lecturer has not touched, but as he confided them to me, so I will in turn confide them to you. The first matter might, perhaps, have been appropriately mentioned at a meeting which was held not long ago here: it was this—that the whole supply of liquor which was taken by the travellers for themselves and party consisted of three bottles of brandy. Of these three bottles, one was broken at the outset, another was distributed at a time of urgent need when a stimulant was absolutely necessary, and the third was carried to Peking. I venture to think that the Army Temperance Association might well make Captain Wellby and Lieutenant Malcolm honorary members of the Society. The other matter is also of considerable interest. The explorers in their tremendous walk across Tibet and China each wore only one pair of boots drawn from the Government Boot Factory at Cawnpore, which is worked by Messrs. Cooper, Allen & Co. Even at the end of their long journey these boots were not worn out, and this fact furnishes very strong testimony to the value of the factory which supplies the British Army with boots.

"I have no doubt, ladies and gentlemen, that you must have all been struck, not only by the valuable geographical knowledge which has been obtained and of which the map before you affords a small measure, but, above all, by the courageous persistence with which Captain Wellby and his companion, Mr. Malcolm, overcame all difficulties under circumstances of great hardship. I am sure you will all agree that it is no small thing that we should have officers who will undertake such explorations which add so greatly to our geographical knowledge, and I am sure you will also agree that our warmest recognition is due to the labours which Captain Wellby and Lieutenant Malcolm underwent and to the remarkable perseverance they showed in their gallant and successful enterprise."

The Commander-in-Chief, in moving a vote of thanks to the lecturer, said:—"Before this meeting closes I should like to dwell for a moment upon a phase of the enterprise of which we have heard but little from the lecturer. I refer to the boldness with which the plan was conceived, and to the resolution with which it was pursued to the end. This boldness and this resolution should be an example to every officer in the army.

"There may be occasions when we hear much of the hardships encountered and of the difficulties overcome by daring travellers, but of these things we have heard little indeed this evening; but if we read between the lines of the lecture we shall perceive that it is as remarkable for modesty as the journey itself was for enterprise; for we shall realise that part of the journey was undertaken across a desert of about 1,000 miles in extent of unknown difficulty and danger.

"As a light sketch of the hardships which fell to their lot, the lecturer says—I can, I think, repeat his exact words—'As for food we had even run out of salt, and when we shot a yak, we used to boil down its fat into cakes, which we munched like cocoanut rock or

Everton toffee.' Such a roseate view of such humble fare is worthy of a Mark Tapley.

"I will try to bring the hardships home to my fair listeners, not by asking them to travel 1,000 miles through a desert in order to munch yak's fat, but I will ask them to go for a day's picnic to Mashobra with the knowledge that yak's fat would be their only fare. Those who had to return on such scanty sustenance would consider they had endured great hardships.

"But, as the sea which swallows up the timid and experienced but ever yields its support to the bolder swimmer who gives it back buffet for buffet and stroke for stroke, so this desert was conquered by the resolution of these two intrepid travellers, who safely reached its further shore; and in conveying the thanks of this meeting to you, Captain Wellby, I know I am but expressing the sense of all here when I say that the only fault we have to find with the lecture is that it passed too lightly over what must have been the very trying and perilous personal adventures of the gallant lecturer and his comrade.

"In asking for a vote of thanks I will ask those only to give it who agree with me in thinking that it was a bold enterprise, a grand and an exceedingly perilous enterprise; and, in conclusion, I must once more allude to the cakes of yak's fat."

THE BEST METHOD OF RECRUITING THE INDIAN ARMIES.

BY CAPTAIN G. S. F. NAPIER, 2ND BATTALION OXFORDSHIRE
LIGHT INFANTRY.

"The best method of recruiting the Indian Armies from sources not hitherto tapped, on the assumption that enlistment amongst the recognised martial races of the Indian Empire and its frontiers has been pushed very nearly to its utmost limits."

"Erst wägen dann wagen."

The idea suggested to the present writer by the above heading is, that the method of recruiting, as at present carried out, is sufficient for the existing Indian Armies, but that information is desired as to the best method of increasing the supply of recruits in the event of its becoming necessary to augment those armies.

In treating of such a subject as this, which embraces ethnographical and political questions referring to a very considerable portion of the British Empire, it becomes necessary to rely almost entirely on the writings of others. Although quotations, from other writers, would appear out of place in an essay, they are still of considerable interest as showing the facts from which deductions have been drawn. Accordingly quotations and précis of information, when they appeared to be of sufficient interest, have been inserted in the Appendices A to F, while details of tribal divisions, cost of transport, etc., are given in Tables 1 to 12.

There are two ways in which the supply of recruits, for the Indian Armies, may be increased, *viz.*—

- (1) By enlisting from fresh races, either in India or abroad, such as appear to possess the qualifications necessary to make good soldiers.
- (2) By finding suitable recruiting grounds, out of India, for the armed forces of those Colonies, or Protectorates, which are at present, either wholly or in part, dependent on India for their supply of recruits.

But before going further it will, perhaps, be well to state briefly what the qualifications are which would appear to be necessary in those races which are chosen for enlistment. They are as follows:—

- (1) The races should be hardy and warlike, of powerful physique, chest development being in proportion to height.
- (2) They should be willing to serve outside their own country.

- (3) They should be readily accessible. That is, there should be no difficult conditions as regards their enlistment, which would augment the cost of raising them to an undue degree.
- (4) Difficulties connected with discipline, pay, rations, or caste prejudices, which would militate against their military efficiency, are undesirable.
- (5) Their general health should be good under the climatic conditions of the locality where it is proposed to employ them. They should have good eyesight.
- (6) It should be possible to raise their non-commissioned officers from amongst them.

We now propose to discuss India, the Persian Gulf, Aden, Africa, Malaya, and China, in turn, with a view to determining the most advantageous manner of employing all accessible warlike races, either for service in India, or in order to supply the requirements of those Colonies and Protectorates which are at present dependent on India for their Military or Police forces.

In conclusion a brief résumé will be given, showing how the steps proposed in the preceding pages will fit into the existing Indian organisation as a whole.

Nobody studying the subject, of which we are now treating, can fail to be struck, at an early period of his investigation, by an anomaly which it presents. For while complaints are constantly being made of the increasing difficulty of obtaining first class men for the Panjab and Bengal Armies, we find that recruiting is being permitted for many places outside India. This outside recruiting bears on the question of supply for the Indian Armies in two ways. But the first of these, that a certain number of men are thereby withdrawn from those available, is merely a minor evil. The great harm done to Indian recruiting lies in the fact that men come back from the Colonial Corps, after ten to fifteen years' service, with a pension and with sums varying from Rs. 1,000 to Rs. 2,000 in their possession; the natural result being that the minds of those who would make good soldiers, and who would probably have enlisted in the Indian Army, have become quite unsettled. Tables 1 to 3 show the approximate number of men serving outside India,* the number of recruits actually enlisted in 1894, and the advantages offered by service in such corps.

* Exclusive of 600 Sikhs temporarily lent to the Uganda and Nyassaland Protectorates.

In the case of Gurkhas and Garhwalis, recruitment for the Indian Army, as at present constituted, is not affected by this outside enlistment, for, while the Indian Army only takes men from Western Nepal and Upper Garhwal, the outside corps are restricted to men from Eastern Nepal and Lower Garhwal. As, however, the subject of this essay embraces the possible future as well as the actual present requirements of the Indian Armies, it becomes necessary to contemplate the contingency of Eastern Nepal and Lower Garhwal being also required as recruiting grounds for those armies.

A proposal has been made to limit the supply of men, for the above-mentioned outside corps, to volunteers of good character, who had already served for five years in the Indian Army.

The relative advantages and disadvantages of such a scheme would be out of place in the present essay, suffice it to say that the scheme was dropped, as it was considered that, with the better pay now offered to the Indian sepoy, the difficulty of obtaining the necessary supply of recruits had disappeared.

It must, however, be remembered that, if this scheme had been carried through, one grave difficulty would still have remained,—in the event of a big war with a European power, or of a war with, say, either Afghanistan or Persia, which occurred simultaneously with two or more smaller frontier expeditions, the Indian Government might be compelled to stop outside recruitment absolutely.

It would seem that the true solution of this difficulty lies in the increased employment, in such outside corps, of the best of the African and Malayan races, supplemented, where necessary, by those races which India can best spare. In the case of Uganda and Nyassaland it appears that this is actually contemplated; the 600 Sikhs serving in these two Protectorates being merely lent for a specified period. In the recent operations against Chikusi, the Chief of the Angoni, the British force actually included a small number of drilled and enlisted Angoni Zulus, in addition to a levy of friendlies. The British East Africa Protectorate has asked for 50 Sikh police for the Uganda railway, but they are merely required as a nucleus, and the rest of the corps is to be raised from local races, probably from those suggested in this essay.

Although the recruitment of Gurkhas and Sikhs, for outside service, should be stopped absolutely, the raising of Pathans might still be permitted, if desired. The supply of fighting material on our

Pathans.

North-West Frontier far exceeds our present requirements, and the Indian Army could be considerably augmented from this direction, were it not for the feeling that we might find them a source of danger and anxiety in troublous times. Much capital has been made of the two shots which were fired during a night advance in a recent frontier campaign, but it is only fair to remember that in 1852, and on many occasions since, the Pathan soldiers of the Panjab Frontier Force have proved their fidelity to us when fighting against kindred races, and therefore their wholesale condemnation, for the sins of one or two individuals, seems neither just nor logical. However, this objection in no way affects the enlistment of Pathans for service in Burma or any of the outside corps. If the men required for these places were raised from trans-border Pathans, employment and good pay would largely increase our popularity and influence amongst them, which in itself would be no small advantage. It would be preferable, however, to assign specified tribes, to be reserved for such outside enlistment, in order to prevent any competition in the market.

In addition to the Pathans proper, there are other races on the North-West Frontier, who might well be given a trial, both in India and in Burma. It is the custom to decry the Swatis, but, since the Chitral campaign, they have done us good service as native levies. They also appear to possess the taste for a roving life to a greater degree than the men of many other classes, so much so, indeed, that camel-men from Swat are to be found in considerable numbers even on the Australian gold-fields. The Swatis, and perhaps the men of Dir, might well be given a trial, both in a Burma Battalion and in the Burma Military Police.

The expediency of raising sapper companies, and a pioneer corps, of Hazaras has been pointed out more than once. As regards the first, although excellent navvies, it seems extremely doubtful whether they would be equal to the technical knowledge which would be required of them. As pioneers, they would suit admirably if they could be got, but they can command such good wages in civil life that it seems extremely doubtful whether the pay of an infantry soldier would be sufficiently high to attract them. The late Sir James Browne, during the discussion succeeding a lecture by Colonel Lance,* related how he once asked an Hazara, at work on the Hurnai railway,

* "Journal of the United Service Institution of India," Volume XIX, page 397.

whether he would accept military service. The Hazara replied that his pick earned him a rupee a day, and he did not see the good of giving it up for the chance of being shot.

Although an attempt has been made to raise Baluchis, it did not prove a success. The Panjabi Baluchis, who are agriculturists, enlist to a certain extent, but the true Baluch, who is a pastoral man, we have hitherto failed to secure. He is described as very hardy, of good physique, brave, free from fanaticism, faithful, straightforward, and obedient. On the other hand, he is very dirty and lazy and he has a rooted aversion to wearing anything but his national dress of dirty white cotton. The Baluchi's greed for money and the implicit obedience which he yields to his chief should be powerful factors on our side. If a Baluch Militia Battalion were raised, for local service, under picked officers, somewhat on the lines of the Khyber Rifles, it would probably prove a success. The local chiefs should be won over, a certain number of commissions should be given to them, the men should be allowed to wear their own clothes, at any rate at first, and above all should not be dragooned. As time went on and they became more accustomed to our service, innovations might be introduced, approximating them more and more to the status of a regular regiment.

The Brahui, like the Baluch, is dirty, lazy, and very averse to change of any kind; he is said, however, to possess good soldierly qualities, and he is probably worth the trouble which it would be necessary to take in order to secure him. As in the case of the Baluch, the best way to make a commencement would probably be to raise a militia levy, gradually introducing the elements of discipline as he became more reconciled to the life and duties of a soldier.

The tribes of Mekran may be roughly divided into—

- (1) Tribes of Baluch descent.
- (2) Tribes of Brahui origin.
- (3) Tribes with Arab blood in them.
- (4) Coast tribes of partly African origin.

The Mekranis are Suni Muhamadans, and speak a language which is described as a patois of Persian. The present writer is unable to pronounce an opinion as to their

military value; but the subject would seem worthy of investigation.

The Muhamadans of Kathiawar are of very fine physique, and would probably make excellent soldiers, but unfortunately they will not enlist. It might, however, be possible to get them for a local class regiment. The enlistment of Kathiawar Hindus has been tried, but it did not prove a success.

The Muhamadan Mapilas of Malabar are the descendants of Arab settlers, who have intermarried with low caste Tamil women. They are wiry and athletic, of fine physique, and have a reputation for bravery and independence of character. When not aroused by fanaticism they are quiet and law-abiding. The North Malabar Mapilas are not so good as those of the southern taluks, Ernad, Wahwanad, and Ponai. The southerner is a shepherd and tiller of the soil, and is much addicted to outdoor sports and athletic games. The landlord and the banniah have reduced him to a condition of extreme distress, and, accordingly, it seems highly probable that he would elect for military service, if the conditions did not violate his prejudices. The enlistment of Mapilas has already been tried, but hitherto without any marked success. They are said to be averse to leaving their homes, and they will not enlist for service with troops of other races. Both these objections, however, could easily be met by raising a class battalion of Mapilas at Cannanore. If localised at first they would gradually lose their aversion to leaving their homes. If the experiment proved a success, their numbers might be augmented later. Even as a local corps, a Mapila battalion would be of great value, since experience shows that Madras troops are not suited to the debilitating climate of the coast. The Kundotti and Ponani sections of the Southern Mapilas are said to hate each other with a deadly hatred, and this fact would have to be borne in mind in recruiting them. Again, the maritime Mapilas, the Pooislams, are mostly converts from the Hindu fisher caste, and, as the other Mapilas look down on them, they should not be enlisted. The total number of Mapilas at the last census was 916,000.

The Nairs have been suggested as a race suitable for enlistment, but, although still of fine physique, they appear to have lost those martial instincts, for which they were noted in the last century, and the present writer is not in favour of enlisting them.

The Coorgs are a hardy mountain race of fine physique, occupying the country between Mysore and Malabar. The resistance, which they offered to the conquest of the country, sufficiently establishes their claims to courage and warlike instincts, and they have since proved so loyal, under our rule, that they have been exempted from the provisions of the disarmament act.

As in the case of the Mapilas, the attempt to enlist Coorgs has hitherto failed, and apparently for the same reasons. If a class regiment of Coorgs were raised at Markara, a certain number of commissions being given to men of position amongst them, the attempt would probably succeed.

The Tiyars, the toddy-drawers of Malabar, are a hardy race ; they are, on the whole, abstemious and moderately temperate. In character they are docile and amenable to discipline. As they are said to be in a state of great destitution they would probably enlist readily. The present writer is unable to offer an opinion as to their probable military value, but the subject appears to be worthy of investigation. The number of Tiyars at the last census was 538,000.

The Nagas and Singphos, on the Assam side of the Palkoi mountains, and the Kachins on the other side, are plucky races of fair physique. They are very active and would make excellent marchers in a hilly country. They might well be given a trial, both in a local regiment for Burma, and in the Military Police. Of the Nagas, the Angamis are the most warlike. They have shown in the past, as at Konoma, that behind good defences they are capable of making a determined resistance. Their system of warfare, however, is essentially one of surprises and ambuscades, and they appear to be eminently suited to jungle fighting in a hilly country.

The Burma Military Police, as at present constituted, contains 1,052 men recruited from the North-East Frontier, exclusive of Gurkhas proper ; these consist principally of Limbus, Raies, and Jharwas. Of the latter class there are 199, but these numbers should be considerably increased. The Jharwas have many of the good qualities of the Gurkhas, and are said to be able to stand unhealthy malarial climates better, so that they would appear to be particularly well fitted for this service.

Although they do not appear to be considered first class fighting material, a battalion of Karens and Red Karens, for local service in Burma,

might prove useful and could replace one of the Panjabi regiments at present serving there. There is a local sapper company of Karens at Mandalay, and an officer, who saw them in action, informed the present writer that they went forward as pluckily as Gurkhas and did not seem in the least afraid. There are 625 Karens in the Military Police, but there seems no reason why this number should not be doubled.

The Chins are, at present, an almost unknown quantity, but, owing to their drunken habits, it seems

Chins. very doubtful whether they would be of any use.

In the Lur tribes of South-West Persia we find a large field of most excellent fighting material.

Lurs. It may be objected that the difficulties connected with their enlistment would be very great, but we venture to think that they are not insurmountable.

The island of Bahren, which is under British protection, might be used as a recruiting depôt, and agents might induce the tribesmen to come down to Bushahr, whence they could be shipped off to Bahren. As long as our Consular Agents at Isfahan and Bushahr did not exert themselves openly, the Persian Government could no doubt be induced to acquiesce tacitly in the matter. The resultant advantages would be very great, for not only should we secure most valuable raw material from which first class soldiers could be turned out, but we should also increase our influence very much amongst a people, who are destined to play an important part, if ever the partition of Persia comes within the range of practical politics.

Sir H. Rawlinson* once described these people as "the very beau ideal of military material, the men being athletic, strong, hardy, and active." The tribes whom we should prefer to enlist would be the Feili Lurs and the Bakhtiaris. The latter are splendid horsemen and should be raised as cavalry. Although both are known to be fearless races, the former have not got so good a reputation as the latter. Colonel Bell,† however, formed a favourable opinion of them, being struck with their decorum and obedience in camp, with their modest and frugal habits, and with their natural simplicity. All writers unite in extolling the Bakhtiari, and we venture to think that the Feili Lur, who is closely connected with him both by race and habits, would be found to have as many natural virtues were he better known.

* Curzon, Volume I, page 291.

† Curzon, Volume II, page 282.

Curzon* writes of the Bakhtiariis "they are modest, though self-contained in deportment, obedient, and hospitable, loyal to family and tribal ties, and wholly free from the abominable vices of the Persians. On the other hand, they are savage when excited, particularly in the pursuit of blood feuds, which are perpetuated from generation to generation."

The tract occupied by the Lurs comprises the entire belt of mountainous country, stretching from the plains of the Tigris and the frontier mountains on the west to the borders of Isfahan and Fars on the east, and from the districts of Kermanshah and Hamadan on the north to the plains of Arabistan on the south. The country to the west of the Ab-i-Diz, or Dizful river, is known as Lur-i-Kuchik, or Lesser Luristan, and is peopled by the Feili Lurs. The country to the east of the Ab-i-Diz, known as Lur-i-Buzurg, or Greater Luristan, is peopled by Bakhtiariis. Lur-i-Kuchik is further divided by the river Kerkhah into Pish Kuh and Pusht-i-Kuh, the former being to the east and the latter being to the west of this river. Owing to the proximity of the towns of Kermanshah, Khoremaabad, and Burujird, to the accessibility of the district and to the neighbourhood of the electric telegraph, the population of Pish Kuh has become more sedentary than that of Pusht-i-Kuh, which is the country of the Feilis proper. South of the Bakhtiariis are the Kuhgelu Lurs, while to the east of the Kuhgelus we find the

Mamasenni Lurs.

Mamasenni Lurs, whom Captain Wells describes as the finest men he has seen in Persia. Further south again we find the Kashkai Lurs, who were once a numerous and powerful community. Their ranks, however, were decimated by the famine of 1871-72. They are gradually abandoning their nomadic habits and taking more and more to a settled existence. In addition to the Lurs, there are numerous Arab tribes in South-West Persia of fine physique and warlike by nature. Particulars of the Lurs and of the Persian Arabs, so far as it has been possible to obtain them, will be found in Table 4.

Four squadrons of Bakhtiari cavalry and two battalions of Lurs, for service in Sind, would be a most valuable addition to the Indian Army. The infantry might be composed as follows:—One battalion Feili Lurs; four companies Bakhtiariis, one company Kuhgelus, two companies Mamasennis, one company Kashkais. The present writer would have liked to

* Curzon, Volume II, page 299.

have suggested the formation of a *depôt* or training battalion at Bahren, but owing to the low altitude of this island and to the consequent high temperature, this would not appear feasible. The island of Kishm, on the Persian Coast, would appear admirably suited to this purpose, the climate being healthy and comparatively cool, while supplies could be obtained at a very cheap rate from the mainland. If political considerations did not forbid it, this island could probably be either purchased or rented from the Persian Government.

The Lurs and Bakhtiaris speak a dialect of Persian. The Language, pay, and ordinary rates of pay, both for infantry and cavalry, would be quite sufficient to tempt the best men. For approximate cost of transport *vide* Table II.

Although the Persian Army, at the present day, is a caricature of a military force, there seems no doubt that the Persian recruit has the makings of a good soldier in him if he were properly handled. Sir H. Rawlinson* spoke of him in 1858 as follows :—"As an animal a Persian is the finest creature in the world ; for an oriental he is so certainly." And again in 1879 :—"There are no people in the world who afford better rough material for military purposes than the Persians. The physique of the men is admirable and their power of endurance is great ; the absence of all habits of intemperance is very important, while the general intelligence and personal courage of the men is beyond all praise. If the Persian material were placed at the disposal of a European power, who would encourage and take care of the men, and develop their military instincts, a fine working army, very superior, in my opinion, to anything that Turkey could produce, might be obtained in a very short period of time.

With regard to the endurance and marching powers of the Persian infantry soldier, Sir H. Rawlinson quotes the 2,500-mile march of an army, under Abbas Mirza, which averaged $21\frac{1}{2}$ miles per day.

Of the available races of Southern Persia, however, the Lurs and Bakhtiaris are unquestionably the most suited to our needs ; and accordingly the enlisting of Persians proper will not be proposed.

The Arabs are described as cleanly, hospitable, truthful, simple, and abstemious in their habits. Palgrave says of them that "they yield to

* Curzon, Volume I, page 610.

few races, if any, of mankind : mentally they surpass most, and are only kept back in the march of common progress by their remarkable want of organising power and their incapacity for combined action." They are generally tall, well formed, and of good physique. The nature of the soil and the climate produce ophthalmia, though not in the virulent Egyptian forms.

Aden Arabs have been recruited, in the past, both for the Hyderabad and Baroda armies. At the present time there is a regiment of African Cavalry Guards in the former army, which consists in part of Aden Arabs. A précis of information, concerning the troops in this corps, will be found in Appendix A. The return, given in Appendix B, of the crimes committed in the regiment during the past ten years speaks very highly for their discipline. Colonel Neville writes of them—"They are plucky fellows, and I feel certain that they would fight extremely well under European officers. They are very easy to lead and attach themselves to their superiors like children, and they never tell an untruth even to defend themselves when accused." As an instance of their pluck, it may not be out of place to mention that on one occasion six Arab soldiers, who had taken possession of a gateway in Baroda City, held it against the forces of that State for four days. Details of the various Arab tribes, in the vicinity of Aden, will be found in Table 5.

One battalion of Arabs, for service in Sind, might be raised experimentally, the force being added to later if thought desirable. The Fadthli, who fought so pluckily against us in 1866, the Subaihi and the Aulaki would appear to be the most suitable for enlistment.

It is stated in paragraph 4 of Appendix A that these men are not easy to get, but, as regards this statement, it must be remembered that $15\frac{1}{2}$ Hali Sicca rupees, or $12\frac{1}{2}$ Government rupees, is very low pay for a cavalry trooper. The present writer has heard it urged that Arab and African races would not accept service in India unless they were permitted to bring their wives with them. He has been informed by two reliable authorities that this is not the case—*vide* Appendix A, paragraph 3.

The southern shores of the Persian Gulf are occupied by numerous warlike tribes, who own no central authority and are always at war among themselves.

Persian Gulf.

The settled Arabs of El Hasa are liable to military service under the Turkish Government. The Beduin tribes are free from military service, but it is doubtful whether political considerations would permit the recruiting of them in territory over which Turkey claims a protectorate.

The Hinavis and Ghafiris of Muskat and Oman would no doubt yield excellent military material, but here also there would be considerable difficulties to be encountered before their enlistment could be taken in hand.

Captain Peyton, who was authorised to raise and equip a force of Somali infantry and cavalry, for the defence of Harrar during its evacuation by the Egyptians, found the Somalis quick to learn, and keen on becoming expert in the use of the rifle and sword. They were nearly all first-rate shots, but had no idea of discipline and would not stand restraint. The Somali by nature is extremely proud, and if worried or nagged will do nothing. Captain Peyton found them staunch in action, absolutely fearless, and with a supreme confidence in themselves and in their getting the best of it. "On one occasion," he writes, "We had very tough work by day and night; our zariba was nearly rushed by Gallas, but the Somalis never wavered and kept very fairly well under control; if they had let the Gallas in, we should none of us have ever got away. By day, fighting through fairly open jungle on the hills they were just tip top, they went straight into the nullahs and drove the Gallas from place to place, shooting in the calmest way possible."

Dr. Peters relates an anecdote,* in illustration of their pride and fidelity, which is worth quoting. At one time the Somalis thought that to proceed further with the expedition was sheer madness and said so openly. Meanwhile the bearers had got wind of what was going on among them, and thereupon they too held a meeting and sent a message to the Somalis that "If you do not wish to go any further with Kupandra Sharo, we shall not go either. Let us know what you have decided to do." The Somalis replied "We are Somalis and you, bearers, are different people; we obey the commands of our chief, and if you are not willing to do so, we shall fight against you at his command, and shoot down every man that runs away." Dr. Peters considers that the Somalis possess great sensibility, but that, if they are properly managed and their prejudices are respected, they are easy to lead. A perusal of the account of

* Das Deutsch-Afrikanische Schutzgebiet.

the "operations against the Munassan section of the Esa tribe" gives one a very good idea of their activity, courage, and fighting qualities. On the night of January 29th, 1890, a force of 25 to 30 Esas rushed the zariba, containing over 350 troops, and penetrated it in two places, inflicting a loss of five killed and sixteen wounded, their own loss being eight killed, of whom five were killed inside the zariba. Colonel Furze speaks in most favourable terms of the Somalis employed in the transport during the Nile Expedition.

Details of the various Somali tribes will be found in Table 6.

The inland Somalis are very hardy, but those from the coast and from Aden are not of such good physique. As their country is a particularly dry one, they should not be employed in damp climates.

Their usual food is milk and meat. When Captain E. J. E. Swayne was on caravan journeys in Somali land, his men frequently went from ten to fifteen days without a meat ration, subsisting simply on rice and dates, to which ghi was added when obtainable. On the coast a Somali's rations are—1 lb. rice, $\frac{1}{2}$ lb. dates, 2 oz. ghi. They do better, however, with meat every five or six days.

All authorities are agreed that Somalis should be enlisted in class regiments and not mixed up with Indian troops, and also that the British officers, to be employed with them, should be selected with care. It would be advisable to commence with a short period of service, giving the men the option of leaving after, say, two years. This could be lengthened subsequently. A rigid uniform need not be insisted on at first, and innovations should be introduced gradually.

A larger number of British officers would be necessary than are allowed in a native infantry regiment in India, but native officers, with the exception of the native adjutant, might be dispensed with.

It is considered that there should be one officer to every 50 men. On the assumption that the strength of a battalion was 800, this would imply a commanding officer, an adjutant, and sixteen company officers.

An estimate of the cost of eighteen British officers has been compared with the approximate amount of pay drawn in an average native infantry regiment in Table 7. From this it will be seen that the increased cost would be about Rs. 2,629 per mensem, but the gain in efficiency would be very great.

The approximate amount of pay of a native infantry regiment has been arrived at by taking the most senior and most junior establishments in the Native Army on January 1st, 1897, and dividing the total by 2. It may be objected that the proposed establishment for a Somali regiment comprises junior officers only, but, if we fall back on history, we find that the policy of Government, in raising new corps, has always been to allot junior officers.

The prospects of good sport, and the chance of active service, would attract plenty of the younger men, while the more senior would probably consider that the conditions, as regards pay, were not sufficiently attractive.

The officers might be posted, as in the Hong Kong regiment, for five years. If an officer wished to stop on after that period, special permission should be necessary to allow him to do so. This permission should only be granted in the case of juniors.

Somali is an unwritten language, and a colloquial knowledge is not difficult to acquire. Officers should be required to pass a lower standard within six months of joining the corps, and a higher standard within one year.

It would be necessary to pay the infantry Rs. 15 and the cavalry Rs. 20 per mensem, naiks receiving Rs. 3 and subadars Rs. 6 extra. At these rates any number of the best men could be got. As they would provide themselves with everything, except arms and ammunition, this would practically be no more than the native infantry get at present, while the cost of the cavalry would be one-third less. In considering, however, the question of extra cost, it must be remembered that, if the garrison duties of Aden and Somaliland were performed by local troops, the cost of transport to and from Bombay would be saved.

Two battalions of Esa infantry and two squadrons of cavalry might be raised at first, one battalion and one squadron taking over the duties of the Aden garrison. The remainder could be stationed in Somaliland and would furnish the detachments at Perim, Berbera, Zaila, Bulhar, and Sheikh Othman. The Aden garrison might be relieved annually.

The force should be formed in Somaliland, say, at Berbera, non-commissioned officers being obtained, in the first instance, from the Somaliland police. Within twelve months

of formation, it would be possible to send four companies to Aden to relieve a wing of the Bombay infantry regiment stationed there. Six months later the Somali force would be in a position to take over the entire duties of the Aden garrison, and the remaining wing of the Bombay regiment might return to India. There would be no danger of combinations between the Somali troops and the local tribes, for, although the latter contain many so-called Aden Somalis, the true Somalis look down on them as an inferior race.

The Danakilis are sparsely scattered over the arid wastes of sand-hills behind Massowah and Obok.

Danakilis.

They are nomad tribes of cattle-breeders, very fierce and warlike by nature. In physique they are wiry and athletic, and they are accustomed to intense heat. In the event of Suakin being ever taken over by the Indian Government, a corps of them might prove very useful there, if they could be induced to enlist, which is doubtful.

It is possible that, before long, Erythrea may become an English protectorate, and in that case we should come into immediate proximity with them.

The Abyssinians are a fine race of good fighting material,

Abyssinians.

but under present conditions their enlistment would not be practicable.

The Gallas are warlike tribes, inhabiting the country to

Gallas.

the south and south-east of Abyssinia, and extending down to the northern territory of the British East African Protectorate. They are at present too wild, but, in the future, they will probably furnish one of the best recruiting grounds in those regions.

The Sudanese, when opposed to us, have repeatedly

Sudanese.

proved what fearless and formidable adversaries they can be, while Ginnis, Toski, and the recent Dongola campaign show that, when trained and led by British officers, they are capable of becoming first class regular soldiers.

Although, during the Dongola campaign, the resistance experienced was not great, the Sudanese troops were always put in the fore-front of the fight, and all officers, who have ever served in the Egyptian Army, speak of them in very high terms. Unfortunately ophthalmia is prevalent among them, and their shooting is not good. The Germans, who have a force of Sudanese in East Africa, say that their only defect is their bad eyesight and a tendency to mutiny, though, curiously enough, cases of individual insubordination were

extremely rare. The Germans also complain of their excitability, and say that fire discipline was hard to enforce.

It may be urged that the available supply of Sudanese at present is merely sufficient to satisfy the requirements of the Egyptian Army. But, as a matter of fact, the German Government recently obtained permission to recruit Sudanese in Egypt for service in East Africa, and it might well be urged that the British nation have a better claim than any other European Power. In any case the reconquest of the Sudan is merely a question of time, and after Khartum has once been reached, there should be no difficulty in obtaining two or more battalions of Sudanese troops for service in India, if desired.

It is difficult to arrive at any safe figures as to the present fighting strength of the Nubians. As Slatin Pasha remarks "at least 75 per cent. of the total population has succumbed to war, famine, and disease." An officer, who is well versed in the races of the Sudan, informed the present writer that one of the results of the recent Dongola campaign would be to place 10,000 men, of excellent fighting material, at the disposal of the Egyptian Government. And we shall probably be understating the mark in saying that, once Khartum is reached, a further supply, of from 30,000 to 40,000 fighting men, will be available. It must be remembered that the Mahdi's successor, on account of his tyrannical and blood-thirsty rule, is heartily loathed by all his subjects, with the exception of his own, the Baggara, tribe, so that once the country is subdued, the bulk of the population will gladly throw in their lot with us.

After the reconquest of the Sudan, we should probably be doing the Egyptian Government a good service by removing a portion of the more warlike element, who must have lost much of their aptitude for peaceful agricultural pursuits during the semi-anarchy of the last twelve years. The conquest of the Sudan, however, cannot stop with the capture of Khartum. By the time that that point has been reached, the Uganda Railway will have made a considerable advance, and between the two an effort should and will probably be made to secure Kordofan, Darfur, and Bahr-el-Gazelle. The latter is a most fertile region, extending over an enormous area, and containing a population, estimated by Slatin Pasha, at between five and six millions, from which most excellent fighting material might be raised.

There are here three races which appear to be suitable for enlistment as soldiers: the Wakambas, the British East Africa. Masai, and the Wakwavi. The former are described as in every way a superior race; their country is fully populated, and kept in a high state of cultivation. The fact that they have not only turned back the Masai warriors, who, for years, attempted by carefully planned raids to carry off their cattle, but have also asserted their independence by successful reprisals in the Masai country itself, proves that they are a brave and manly people.

The Masai are a purely pastoral, nomadic race, inhabiting a considerable portion of the elevated plateau lying between the Victoria Lake and the east coast. Mr. Joseph Thomson estimated the population of this nation at about two millions, but this is probably too high. Even in time of peace their warriors are restricted to a meat diet, but may drink uncooked milk mixed with blood. When training for war or for a raid, they eat only raw beef, with which they gorge themselves under an impression that it increases their savage and reckless ferocity.

As a race, they are remarkable for their fine physique, the men being commonly considerably above 6 feet in height.

Until recently the various tribes were engaged in continual internecine wars, apparently undertaken merely for the insatiable love of fighting and greed for cattle. Such hostilities were conducted under well-defined rules and with considerable chivalry; and even in attacking a caravan, they send a courteous challenge and state at what hour they propose to make their attack.

The Wakwavi are the remnants of Masai tribes, who, having suffered heavily in these internecine wars, have settled in adjacent countries, and, finding no scope for nomadic habits, have taken to agriculture. As a rule, they have become peaceable and are generally remarkable for honesty. Mr. Thomson considers that this remarkable development of peaceful habits and honest ways shows what the Masai, from their distinctly higher mental faculties, are capable of, when cut off from their traditions and brought under conditions more favourable to their advancement towards civilisation.

These races have been mentioned in order to show how absolutely unnecessary it is to tax the resources of the Panjab by enlisting Sikhs for East Africa.

English officers should be able to raise splendid battalions of Wakambas and Wakwavis for service in these regions, and, eventually, as the country became more pacified, the Masai might also be enlisted for the same purpose.

As a minor detail, the two Mauritius Asiatic Artillery Companies should also be recruited from this source.

The Zulu is a born soldier, recognising the necessity of discipline and submitting to it, no matter how severe it may be. He is honest, bold, good-tempered, trustworthy to a fault, and cleanly in his habits. His mental capacity is of a fine order, and, even without education, he is said to be intellectually superior to the lower class of the agricultural population of England. Of powerful build, he is capable of great endurance, if well fed, and would probably cover 40 to 50 miles a day on foot, with ease, requiring only a handful of maize and a little water as sustenance. For service in his own country no better material could be wanted. Unfortunately, however, the Zulu is devotedly attached to a domestic life and his longing to return to his own kraal, even after a short absence, is very great. In addition to this he is slow to adapt himself to new ideas and he entertains a profound dislike to the sea. Accordingly it is highly improbable that any number of Zulus would be found willing to enlist for foreign service at first. Before many years have elapsed, a large armed force, on the lines of the Indian Staff Corps, will be an absolute necessity for the maintenance of the British power in Africa. When that time comes the Zulu will be estimated at his proper value. By giving him a legitimate outlet for his warlike instincts, we shall attach him more closely to ourselves, and in time, as he becomes more accustomed to service under British leaders, he will no doubt so far lose his dislike to the sea as to enlist for foreign service. Powerful factors to this would be the Zulu's love of fighting and his love of wealth.

It is of interest to note here that Major Wissmann succeeded in enlisting a certain number of Zulus, in Mozambique, for service in German East Africa. On the reorganisation of the German Colonial forces, however, these Zulus were replaced by Sudanese and Somalis, from which it appears that the experiment did not prove a success. Probably Zulus of an inferior class only were obtained.

The enlistment of Angoni Zulus has already commenced in Nyassaland, and a few of them were recently employed, with the Sikhs, in the operations against Chikusi.

A précis of information, concerning the more warlike of the South African races, will be found in Appendix C.

Both Malays and Dyaks are of fairly good physique, and they are at home in swampy malarial country, which would prove fatal to troops of many other nationalities; in their own jungles, when opposed to ill-armed adversaries, they fight pluckily, but whether they would be equally reliable, in the open, opposed to troops armed with breech-loaders, seems at the least doubtful. The present writer feels great diffidence in expressing this opinion, since their enlistment for service in Madras and Burma has already been championed by an officer of very considerable experience.

But, before countenancing their employment in the regular Indian Army, it would seem preferable to first try them as Military Police in Burma. A battalion of Malay Military Police might be raised, to replace one of the existing battalions of Sikhs or Gurkhas, which might be transferred to the regular army. The present writer, however, is of opinion that the cost would be out of proportion to the gain, and that as good material might be found nearer home in the hill tribes of Assam, the Karens, and the Panthays.

Still for dacoit hunting in thick jungle, in unhealthy fever districts, the Malay would probably be in his element, while experience has shown that the natives of Northern India are but ill-suited for service in the unhealthy climates of the Burmese frontier. If the experiment proved a success, their numbers might be gradually increased. The best districts, from which to enlist them, would probably be the Native States of Tringganu and Kelantan. The population of Tringganu is 45,000. Kelantan was formerly the most thickly populated Malay State in the Peninsula, but, owing to a variety of causes, the population of late years has been much reduced.

An estimate of the cost of their transport to Rangoon is given in Table 11. In Appendix D will be found a short précis of the information, which has already been published on the subject. Appendix E contains an opinion as regards the suitability of Dyaks for military service, and is an extract from a letter, written by a gentleman, who has been for many years in the service of the Raja of Sarawak, and whose opinion is entitled to great weight. Appendix F contains particulars of the Malay sappers at Singapore, and also an opinion, concerning their military value, expressed by a sapper officer, who has served with them.

Malays could be got for Rs. 16 per mensem. The cost of transport from Singapore to Rangoon is given in Table 11. The language is said to be easy to acquire.

The Chinaman is a good navvy, and possesses great physical dexterity. He is accustomed, from his youth upwards, to every imaginable privation as well as to unquestioning subordination and obedience. He is capable of undergoing fatigues under which the soldiers of civilised nations would soon give way. A handful of rice suffices for his daily food. Almost his only vice is that he is addicted to the smoking of opium. The consensus of opinion, however, of those best able to judge seems to be that the Chinaman has not enough courage ever to make a first class soldier. Still he is said to be a much better labourer than any native of India, and as he could be got as cheaply as the latter, it is worth while considering whether we could utilise his services. This might be done in three ways :—(1) in Sapper Companies, (2) in a Pioneer Battalion for the lines of communication, and (3) in a Railway Battalion.

Although there are Sapper Corps for Bengal, Bombay, and Madras, no such organisation exists at present in the Panjab. A suitable establishment for a Panjab Corps is given in Table 8.

The existing Pioneer Battalions would all be required in the front, in the event of an advance into Afghanistan, by both the Kabul and Kandahar lines ; accordingly a Chinese Pioneer Battalion, for service on the lines of communication, would undoubtedly prove most useful. Hazaras have been suggested for this purpose, but, as has already been stated, it is extremely doubtful whether good men could be got for the money which would be offered.

If it ever again becomes necessary to advance into Afghanistan, there seems little doubt that the Government would at once undertake the construction of railways, from our existing frontier system, towards Kandahar and Kabul. The importance of having an enlisted railway battalion, for this purpose, was most ably pointed out by Major Ferrier, in his recent lecture on "Railways in War," and his opinion was corroborated, during the discussion which ensued, by Sir Edwin Collen and Colonel Bisset.

It is necessary, however, to consider how such a battalion could be kept trained in time of peace, so as to be in an efficient state when the necessity for its employment arose.

If we turn to Russia, we find that tracts of strategic railway are there placed under the management of railway battalions. The Trans-Caspian railway, for instance, being at first entirely, and now partially, worked by the two Trans-Caspian Railway Battalions.

In the case of India the North-Western Railway, from its strategic nature, at once suggests itself for this purpose. The present writer is of opinion that the personnel of the North-Western Railway should be entirely composed of men enlisted in Railway Traffic Companies, the higher element being composed of Royal Engineer officers.

It may, however, be urged that the personnel of the North-Western Railway would all be required, in time of war, to work that line, but it must be remembered that, in addition to the main line, along which the stream of mobilisation trains would pass, there are a number of branch or feeder lines, whose traffic would decrease considerably during time of war, and whose personnel, consisting of regularly enlisted traffic companies, might be removed bodily for service beyond the frontier, their place being taken temporarily by civilian railway employes brought from down country. Under such a system the base and trans-frontier lines would be part and parcel of one organisation, and, both being under the direct control of the military authorities, the resultant advantages, as regards smoothness of working, would be incalculable.

The importance of this uniformity, in the working of railway lines in war, was most strongly insisted on in a recent lecture* delivered in Russia. The lecturer pointed out that, to attain this end, it was necessary to arrange, in time of peace, for absolute uniformity, both in the composition of the personnel and also in the system of signalling, traffic regulations, etc. In other words the personnel, both of the main and the trans-frontier lines, should be trained, in time of peace, in accordance with the conditions which will hold in time of war.

The existing personnel of the North-Western Railway might be given the option of enlistment, no new men being engaged who were unwilling to enlist. Thus, in time, the traffic companies might be completed.

* Russki Invalid, 16th January 1897. Lecture delivered at the Nikolaievsk Academy of the General Staff.

The construction companies might be composed entirely of Chinamen, and might be raised at once, being trained in peace-time with work on any Government railway constructions, say extensions in Burma, which were on hand at the time. A proposed establishment for such a railway battalion is given in Tables 9 and 10.

The pay of a cavalry soldier in the Chinese Army is about Rs. 7-8-0 per mensem, besides forage money; that of an infantry soldier about Rs. 5-8-0 per mensem. Major H. Bower is of opinion that good men could be got for Rs. 9. Working pay, however, should be given in addition to this on the same scale as that drawn by the existing Sapper and Miner Companies.

The best men could be got from the Shantung Peninsula; the men from Canton and Foochow would probably be the cheapest.

A colloquial knowledge of Chinese can be picked up fairly quickly.

For cost of transport *vide* Table 11.

The Panthays of Western Yunnan are a Muhamadan race, closely allied to the Tunganis of Kansu. They are described as intelligent,

courageous, and strictly honest, and have great ideas of discipline. They are generally well made athletic men and would be good marchers in a hilly country. They abstain, as a rule, from strong drink, tobacco, and opium. The male population was formerly almost entirely military and fought pluckily against the Chinese during the Muhamadan rebellion. They have now taken to trade and come down regularly during the cold weather from Western Yunnan across the Koonlong ferry to Mandalay and the Ruby Mines. There are a certain number of them settled in our territory, principally at the Ruby Mines (Mogok) and Panglong; there being about 150 of their houses at each of these places.

They would be most useful for fighting on the Burmese frontier, and appear to be well suited both for service in local Burmese battalions and also in the Military Police. Except in the cold weather, they would have to be kept in the hills, as they do not like heat. But they might be assigned stations in the Shan Hills, such as the Ruby Mines, Lashio, and Fort Stedman. They hate the Chinese, and would therefore have no temptation to be disloyal to us, if we enlisted them. There were about 30 Panthays in the Burma Military Police two years ago, and it has been proposed to enlist 200 more.

The Lolos are found in the mountainous country of Yunnan and Szechuan, and are, at present, beyond our reach. In view, however, of the possibility of our frontier being extended further east, a few words about them may not be considered out of place.

They are the most independent of all the tribes in the south-west of China, and they spend much of their time in raiding the Chinese, who have never succeeded in subduing them. M. Rocher describes them as indefatigable workers, endowed with a strength rare amongst Asiatics. A missionary, who has had considerable opportunities for forming a sound opinion, considers that the Lolos are the only race in China, who are capable of making first class soldiers. They do not smoke much opium, and they rarely drink. They subsist principally on potatoes and buckwheat, and regard rice as a great luxury.

Conclusion.

As these two armies contain the flower of the Indian Panjab and Bengal races, the present writer has here limited his proposals to employing Chinese in Sapper, Pioneer, and Railway Corps, and to reducing the drain on Sikhs and Gurkhas for service in Burma and the Colonial Corps. The principal outside demand on these two races is from Burma, as will be seen by reference to Tables 1 and 2. In the Burma Battalions of Madras Infantry the Sikhs might well be replaced by trans-frontier Pathans and the Gurkhas by Panthays. In the Burma Military Police an increased number of trans-frontier Pathans, supplemented by Jharwas, Nagas, Karens, and Panthays, could safely replace the Sikhs, Panjabi Muhamadans, Rajputs, and Gurkhas. In the Hong Kong Battalion the number of Pathans could be increased from two to four companies, while the same class might replace the Sikhs in the Hong Kong Artillery. The Hong Kong police, who are principally Sikhs, should be raised from Dyaks or Malays. These latter races might also be usefully employed in the Perak and Selangor Military Police and in the Straits Settlements Civil Police, being stiffened, if thought desirable, by a leaven of Swatis or Pathans. The employment of Swatis and Pathans for the Ceylon Artillery is also recommended, while it is suggested that the Mauritius Artillery Company should be recruited from East Africa. As the Sikhs in Uganda and Nyassaland are merely on loan, their case is not considered.

Proposals affecting Burma have already been made while

treating of the Panjab and Bengal Armies.

Madras Army.

In Madras proper the enlistment of Mapilas and Coorgs in class regiments has been suggested as a politic measure, but reorganisation should not stop there. A discussion of the best means of improving the Madras Army, however, by weeding out the useless races and increasing the number of those of value, is hardly within the scope of the present essay.

In the Bombay Army it is proposed to raise two battalions

and four squadrons from the Lur races of

Bombay Army.

South-West Persia, and one battalion of

Arabs from the vicinity of Aden, in order to garrison the unpopular stations of Sind. The experiment of forming an irregular corps of Baluchis and Brahuīs, with a view to increasing our influence amongst them, and of reconciling them to military service, is also suggested. Finally, the formation of two battalions of infantry and of two squadrons of cavalry from the Somali tribes would satisfactorily settle the question of the Aden, Perim, and Somaliland garrisons.

The Sudan and British East Africa have also been indicat-

Unappropriated sources.

ed as sources, from which a well-nigh inexhaustible supply of excellent raw material might be drawn, should the necessity arise. As already pointed out, it seems doubtful whether true Zulus would be forthcoming in any considerable numbers, for service outside their own country; but as time goes on this prejudice is sure to disappear, and when it does another vast recruiting ground will have been thrown open.

Although an attempt has been made in these pages to show that India can command an almost unlimited supply of excellent fighting material from other portions of the British Empire, the true employment of that material is, undoubtedly, to take the place of the Panjab and Bengal sepoy in garrisons beyond the seas. If the outside demand for Indian recruits is removed, many years will elapse before it becomes necessary to raise African or Arab levies for the defence of the Indian frontiers.

Table 1.
Composition of outside corps, Burma Battalions, and Burma Military Police.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Corps.	Sikhs.	Panjabi Muhamadans.	Dogra.	Pathans.	Jats.	Hindustani Muhamadans.	Brahmans.	Rajputs.	Gurkhas.	Garhwals.	Assamese Hill-men.	Karens.	Various.	Total.	Remarks.
Hong Kong Regiment . . . . .	...	400	...	300	...	300	...	...	...	...	...	...	...	800	Probably includes a few Jats. Composition approximate.
Hong Kong Artillery	223	223	...	...	...	...	...	...	...	...	...	...	...	446	Includes some Malays. Composition approximate.
Ceylon Artillery	50	...	...	...	75	...	...	25	...	...	...	...	64	214	Exact composition not known.
Mauritius Artillery . . . . .	...	...	...	...	...	100	50	50	...	...	...	...	...	200	Possibly includes a few Sikhs.
Singapore Artillery . . . . .	...	120	...	...	...	...	...	...	...	...	...	...	...	120	Annual Caste Returns, 1st January 1896.
10th, 12th, 20th, 30th, 31st, 32nd, and 33rd Burma Battalions.	2,221	1,588	196	346	82	65	174	165	755	...	83	...	163	5,838	Writer unable to ascertain details in time for insertion.
Hong Kong Police . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...	?	Believed to be all Sikhs.
Perak and Selangor Military Police	500	...	...	...	...	...	...	...	...	...	...	...	...	500	Principally Sikhs and Panjabi Muhamadans, but exact composition not known.
Straits Settlements Civil Police . . . . .	?	?	...	...	...	...	...	...	...	...	...	...	...	500	Military Police Caste Return of 1st January 1896. Column 12 includes Jawas.
Burma Military Police	4,195	2,571	187	305	472	690	938	1,143	1,619	501	1,052	615	775	15,093	Approximate only.
Andaman Police	800	...	...	...	...	...	...	...	...	...	...	...	...	800	

Table 2.

Number of recruits actually enlisted in outside corps, etc., during 1894.

Corps.		Sikhs.	Panjabi Muhama- dans.	Dogras.	Pathans.	Jats.	Hindustani Muha- madans.	Brahmans.	Rajputs.	Tamils.
Colonial Regular Corps.	Hong Kong Regiment . .	...	...	...	6	...	...	...	...	...
	Hong Kong Artillery . .	13	...	...	...	...	...	...	...	...
	Ceylon „ . .	15	...	...	...	27	...	...	2	5
	Mauritius „ . .	...	...	...	...	...	24	...	...	...
	Singapore „ . .	...	10	...	...	...	...	...	...	...
	Burma Battalions,* Madras Infantry.	164	87	16	62	...	...	...	...	...
Colonial and Burma Police.	Hong Kong Police . .	30	...	...	...	...	...	...	...	...
	Perak „ . .	150	...	...	...	...	...	...	...	...
	Selangor „ . .	50	...	...	...	...	...	...	...	...
	Burma Military Police* . .	250	250	50	100	...	200	100	150	...
Total . .		672	347	66	168	27	224	100	152	5

* The Burma Battalions took 65 Gurkhas, and the Burma Military Police 200 Gurkhas and 100 Garhwalis—total 265 Gurkhas and 100 Garhwalis.

Table 3.
Relative advantages offered by outside corps.

Corps.	Pay, 30-day month.	Deferred pay.	Rations or compensation.	Good-conduct pay.	Clothing.
Ordinary regiments of Indian Army	Rs. 9 0 0	None	Compensation for cost over Rs. 3-8.	Rs. 1 per month per badge after 3, 6, and 10 years.	Kit money Rs. 30 on enlistment and Rs. 5 per annum afterwards.
Hong Kong Regiment	17 3 0	As a year for 12 years for rank and file and for 21 years for havildars.	Free rations, and also rations for families.	Annas 10 ples to per 30-day month for each badge after 3, 6, 12, 18, 24, and 28 years.	Free on enlistment with certain annual renewals. Other renewals at own expense.
" Artillery	17 3 0	"	"	"	"
Mauritius	13 8 0	"	"	Eight annas a month per badge after 2, 6, 12, 18, 24, and 28 years.	"
Ceylon	13 8 0	"	"	"	"
Singapore	18 3 0	"	"	As for Hong Kong Regiment.	"
Hong Kong Police	28 2 0	None	Not given apparently.	Not given	Free.
Perak Sikhs	20 4 0	"	"	Rs. 2-4-0 extra to 2nd class, and Rs. 4-8-0 to 1st class privates, additional.	?
Burma Military Police	14 0 0	"	Compensation on a special scale about equal to that in Native Infantry.	Rs. 1 a month extra to 2nd class and Rs. 2 to 1st class sepoy instead.	Kit money Rs. 30 on enlistment and Rs. 10 per annum afterwards.
Burma Battalions of Madras Infantry	11 0 0	"	Free rations	As in Native Army	As in Native Army.

Table 4.

The Lurs of South-West Persia.

Name of tribe.	Number of population.	Fighting strength.	Remarks.
Lurs of Pish Kuh . . .	210,000, including dependencies.	?	The two main tribal divisions are the Gulek and Selewerzi. These are again subdivided respectively into the Amala and the Bala Giriwa and the Sila Sila and Dilan tribes. The Drikwands, who are a sub-tribe of the Bala Giriwa, are well known on account of their turbulence and brigandage.
Feili Lurs of Pusht-i-Kuh . . .			
Bakhtiari's	170,000, including dependencies.	10,000	Smaller men than the Bakhtiari's. Mostly Shiah Muhamadans; they entertain very little respect for the Prophet or the Koran, and have <i>pirs</i> , or holy men, of their own. The Sagwands, a subdivision of the Bajilan tribe, are best known on account of their predatory habits.
Kahgelu Lurs	?	?	Like the Feilis, the Bakhtiari's are lax Muhamadans. They are divided into Haft Lang and Chehar Lang. The Haft Lang are again subdivided into Bakhtiariwands, Durakis, Fabadis, and Dinarunis. The main subdivisions of the Chehar Lang being Kunursi, Mahmud Saleh, Mogui, and Janiki Garmsir. Resemble the Bakhtiari's in manners, customs, and religion. They are subdivided into Bah-i-Rahmet, Nowi, Dushman Ziari, Charum, Bahmei, Teibi, Dehdast Yusuf, Agha Jeri, Humei, Zeidan, Tang-i-Iekao-Sirawi, and Bander Dilam.

Mamasenni Lurs	.	.	19,000	?	With the following subdivisions :—Rustam, Bekshi, Javi, and Dushman Ziari.
Kashkai Lurs	.	.	10,000 to 12,000 tents	?	There are about 14 nomad and 4 stationary subtribes of the Kashkais; of these, the Kashkuli and Shish Buluki are the best known of the nomads and the Alabeglu of the stationary ones. They all have the reputation of being confirmed robbers.

The Arab tribes of South-West Persia.

Name of tribe.	Number of population.	Fighting strength.	Remarks.
Khamsah	3,000 tents	?	Scattered over the same region as the Kashkais and divided into Basiri, Nafar, Baharlu, Ainalu, Shaiwani, Safari, and Jabbarah. Perhaps the Baharlu are the best known. They are all confirmed robbers.
Beni Lam	?	?	Noted robbers: principally in Turkish territory.

The most numerous race in Arabistan is the Kaab or Chaab, with a population of 62,000. The Kaabs claim to be of pure Arab descent. In addition to the Kaabs, Arabistan contains a population of 137,000 of mixed Arab and Persian descent.

The following are some of the principal tribes, and are all said to number 500, or more, adult males :—Al-bu-Ghubaish, Askirah, Khanafrah, Bawieh, Bait-al-Haji, Beni Rushaid, Beni Saleh, Beni Truf, Hamudi, Humaid, Kindazi, Juri, Kathir, Muhaisen, Naisieh, Nasara, Sharafat, Shurafa, Suwari, Sudan, Sleiman.

Table 5.

Subsidiary Arab States in the vicinity of Aden.

Name of State.	Estimated population.	Estimated fighting strength.	Remarks.
Abdali	30,000	9,000*	The most civilised but least warlike of all the tribes in South-West Arabia. These numbers include about 1,200 Sabaihis, who are said to be a treacherous tribe.
Akrabi	800	250	A brave but treacherous race. Formerly a sub-tribe of the Abdali.
Alawi	1,500	500	
Amir of Dthali . .	4,000	1,300*	Agriculturists. Not warlike.
Upper Aulaki . . .	?	?	Divided into two sections, the Upper and the Lower, each governed by an independent Sultan. A warlike, but not a predatory, tribe. Some of the Lower Aulaki are in the service of the Nizam of Hyderabad. The Lower Aulaki may be further subdivided into the Lakmush and the Ba Kazim. The former claim to be a distinct race, their head-quarters are at Khubr. A brave people; superior to and feared by their neighbours. The Ba Kazim are further divided into many sub-tribes, of which the Jarli are the more numerous and form the army.
Lower Aulaki . . .	15,000	5,000*	
Fadhli or Fadhli . .	20,000	6,800	A proud, warlike, and independent race. Lar Muhamadans. They are vindictive and treacherous enemies, but their friendship once secured, they are said to be trustworthy.
Haushabi	6,000	2,000	Mostly nomads; some few occupy themselves in cultivating and driving camels.
Wahidi	9,000	3,000*	Comprise both settled agriculturists and Beduins. The former hold the land on a military tenure, engaging to serve in time of war when called on. One of the least aggressive tribes in the country. For the most part peaceful tillers of the soil, fighting only when obliged to repel intruders.
Yafi-us-Sufia, or Upper Yafi.	45,000*	15,000	The Sultan employs a standing army.
Yafi-ul-Ulya, or Lower Yafi.	20,000	6,000*	
Sheikh of Irka . . .	?	?	
Mahri tribe of Kishn and Sokotra.	59,000	18,000*	These numbers include the Beduin tribes. The population of Sokotra is 9,000. The Mahri tribes carry a sword which is never sheathed, also a stick sharp pointed at each end, in the use of which, as a weapon of offence, they are very expert.
Kayti and Kasadi . .	59,000	18,000*	These numbers include the Beduin tribes.
Kathiri	22,000*	7,000	A warlike and courageous people, extremely loyal to their chief.

N.B.—Figures marked * are approximate only.

Table 6.

Somali Tribes.

Name of tribe.	Fighting strength.	Remarks.
Esa	11,000	These numbers do not include the Black Esa, who are in French territory. Would make splendid infantry, and are a comparatively orderly tribe. Being at a disadvantage as against mounted tribes, they always attack at night.
Warsangali	6,000	Divided into 18 clans, all of whom obey a common chief more or less. On south coast of Gulf Aden. Might be collected from Zeyla.
Gadaboursi	15,000	Less sturdy than the Esa, but well-mounted and good horsemen.
Habr Awal	25,000	More accustomed to foreign service than the other tribes, having already been used abroad. Their territory touches the coast at Berbera.
Habr Gerhajis	10,000	Good horsemen.
Habr Toljaala	7,000	On the coast, east of Zeyla. Rather wild.
Dalbahanta	20,000	Of this number, probably 15,000 mounted. Good horsemen. Far inland. They use the port of Heis. More uncivilised than the others, some of the furthest-off sections being very wild. They, however, ship at Aden as stokers. Those from further inland are of better physique than the Habr Awal, but not so sturdy as the Esa.

Table 7.

Comparison of cost of proposed establishment of 18 British officers, for a Somali regiment, with existing organisation in the Native Infantry.

<i>Somali Regiment.</i>		Rs. A. P.	Rs.	Rs. A. P.
1 Major (temporary Lieut.-Col.) Commanding .		640 14 0 + 600	=	1,240 14 0
1 Captain (Senior Company Commander) .		374 1 6 + 270	=	644 1 6
1 „ (2nd Senior Company Commander) .		374 1 6 + 225	=	599 1 6
2 Captains (Company Commanders) .		374 1 6 + 175 × 2	=	1,098 3 0
4 Lieutenants (Company Commanders) .		225 12 0 + 175 × 4	=	1,603 0 0
8 „ (Company Officers) .		225 12 0 + 100 × 8	=	2,606 0 0
1 Lieutenant and Adjutant .		225 12 0 + 250	=	475 12 0
Quarter Master's allowance (given to one of the Company Officers)				
			=	100 0 0
1 Native Adjutant		50 0 0 + 17-8-0	=	67 8 0
Total .				8,434 8 0

<i>Most Senior Establishment in Native Infantry on January 1st, 1897.</i>		Rs. A. P.	<i>Most Junior Establishment in Native Infantry on January 1st, 1897.</i>		Rs. A. P.
(1 Lieutenant-Colonel, 1 Major, and 6 Captains.)			(2 Captains and 6 Lieutenants.)		
1 Lieut.-Col. Commanding .	1,427 14 0		1 Captain, Commanding .	974 1 6	
1 Major, 2nd-in-Command .	910 14 0		1 „ 2nd-in-Command .	644 1 6	
1 Captain, Wing Commander .	604 1 6		1 Lieut., Wing Commander .	455 12 0	
3 Captains, Wing Officers .	1,422 4 6		3 Lieuts., Wing Officers .	977 4 0	
1 Captain, Adjutant .	574 1 6		1 Lieut., Adjutant .	425 12 0	
1 „ Quarter Master .	524 1 6		1 „ Quarter Master .	375 12 0	
Total .		5,463 5 0	Total .		3,852 11 0

	Rs. A. P.
Average	4,658 0 0
1 Subadar-Major	150 0 0
3 Subadars @ Rs. 100	300 0 0
4 „ @ „ 80	320 0 0
3 Jemadars @ „ 50	150 0 0
1 Native Adjutant	67 8 0
4 Jemadars @ Rs. 40	160 0 0
Total	5,805 8 0

Thus the proposed establishment of 18 British officers for a Somali Regiment would entail an increased expenditure of about Rs. 2,629 per mensem, but against this the cost of transport from Bombay would be saved.

Table 8.

Proposed establishment of a Panjab Corps of Sappers and Miners, on the basis of the three existing corps.

Detail.	"A" Com- pany.*	"B" Com- pany.†	Six Service Companies.	Total.
Company Commanders . . .	1	1	6	8
Company officers . . .	1	1	6	8
British non-commissioned officers .	14	2	12	28
Subadars	1	1	6	8
Jemadars	1	1	12	14
Havildars	7	6	36	49
Naiks	8	10	60	78
Sappers	102	150	900	1,152
Buglers	1	2	12	15
Total Combatants .	136	174	1,050	1,360
Followers—				
Lascars	1	1	6	8
Bhisties	2	4	12	18
Sweepers	2	4	12	18
Total Followers .	5	9	30	44

* Comprises Pontoon, Telegraph, and Field Printing Sections.
† Depot Company.

Table 9.

Proposed establishment of a Railway Battalion, consisting of a Staff, two construction and two traffic companies.

Royal Engineer Officers—

Commandant	1
2nd-in-Command	1
Company Commanders	4
Adjutant	1
Quarter Master	1
Medical Officer	1
Total	9

Native officers and men—

Subadar-Major	1
Subadars	4
Jemadars	16
Havildars	40
Naiks	40
Paid Lance-Naiks	40
Unpaid Lance-Naiks	80
Buglers	8
Privates	876
Total	1,105

Table 10.

Proposed establishment of a Railway Company, whether construction or traffic.

Royal Engineer Officer—

Company Commander	1
Total	1

Native officers and men—

Subadar	1
Jemadars	4
Colour and Pay Havildar	1
Havildars	9
Naiks	10
Lance-Naiks (Paid)	10
" (Unpaid)	10
Buglers	2
Privates	219
Total	266

Table II.

Cost of transport and distances in miles.

From	To	Cost in rupees of single-deck passage.	Distance in miles.	Remarks.
Aden . . .	Karachi . . .	...	1,450	
" . . .	Bombay . . .	20	1,950	
Bahren . . .	Karachi . . .	24	1,110	
" . . .	Bombay . . .	25	1,610	
Berbera . . .	Aden . . .	...	119	
Bushahr . . .	Karachi . . .	26	1,280	
" . . .	Bombay . . .	30	1,780	
Hong Kong . . .	" . . .	80	3,971	<i>Via Colombo.</i>
" " . . .	Calcutta . . .	100	4,360	<i>Via Colombo, 50 dollars. 3,140 miles direct.</i>
Mombassa . . .	Bombay . . .	...	2,425	
Muskat . . .	Karachi . . .	30	490	
" . . .	Bombay . . .	15	990	
Port Durban . . .	" . . .	19	3,989	<i>For Zululand.</i>
Shanghai . . .	" . . .	60	4,841	
" . . .	Calcutta . . .	90	5,230	<i>Via Colombo, 60 Tals.</i>
Singapore . . .	Rangoon . . .	180	1,493	
" . . .	Calcutta . . .	15	1,730	
Suakin . . .	Karachi . . .	25	2,208	
" . . .	Bombay	2,615	

Table 12.

List of books, bearing on the subject, which have been consulted.

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| India. | Annual Caste Return of the Native Army
in India, 1896. |
| Census of India, 1891. | |
| Macgregor—Note on the Angami Naga. | |
| Ney Elias—Introductory Sketch of the History of the Shans. | |
| United Service Institution of India—Recruiting for the Native
Army.—Lecture by Colonel F. Lance, Volume XIX. | |
| Prize Essay on recruiting by Lieutenant Cardew. | |
| Essays by Lieutenant-Colonel King-Harman and Major Barrow,
Volume XX. | |
| Lurs and Bakhtiariis. | Curzon—Persia. |
| Ainsworth—The River Karun. | |
| Wilson—Murray's Hand-book to Asia Minor, Trans-Caspia,
Persia, etc. | |
| Arabs. | Povah—Gazetteer of Arabia. |
| Wheeler—Gazetteer of Arabia. | |
| Prideau—Report on Arab Tribes in the vicinity of Aden. | |
| Hunter—Statistical Account of the British Settlement of Aden. | |
| Hunter and Sealy—Account of the Arab Tribes in the vicinity
of Aden. | |
| Somalis. | Operations against the Munassan Section of
the Esa tribe in Somaliland in January and
February 1890. |
| Peters—Das Deutsch-Afrikanische Schutzgebiet. | |
| Furze—Report by Director of Transport, Nile Expeditionary
Force—History of Sudan Campaign. | |
| Sudanese. | Slatin Pasha—Fire and Sword in the Sudan. |
| "Broad Arrow," 12th December 1896, page 682—Experiences of
the Germans as regards the Sudanese on active service. | |
| East Africa. | Tomson—Through Masai Land. |
| Consul Holmwood's report on East Africa. | |
| South Africa. | Zululand, I. D. W. O., 1895. |
| "Revue du Cercle Militaire," 2nd January 1897—Article on the
military forces in German East Africa. | |

List of books, bearing on the subject, which have been consulted
—contd.

Transvaal Territory, I. D. W. O., 1881.

The Colony of Natal, I. D. W. O., 1879.

Basutoland, I. D. W. O., 1880.

Orange Free State, I. D. W. O., 1878.

Cape Colony, Kafraria and Basutoland, I. D. W. O., 1877.

Mathers—Zambesia.

Oates—Matabeleland and the Victoria Falls.

Montagu—Campaigning in South Africa.

Norris Newman in Zululand with the British.

Malays and Dyaks. Stanford's Compendium of Geography, Australasia, Volume II.

H. Ling Roth—The Natives of Sarawak and British North Borneo.

Carl Bock—The Head-Hunters of North Borneo.

Hand-book of the British North Borneo Company.

Crawfurd—History of the Indian Archipelago.

Colonel King-Harman, "Journal of the United Service Institution of India," Volume XXIV, page 117—Malaya as a possible recruiting ground.

The Geographical Journal, January 1897—A description of Tringganu and Kelantan.

Chinese, Panthays, Colonel Mark Bell—China.
and Lolos.

Baber—Report on a journey through Yunnan.

Anderson—Expedition to Western Yunnan.

Emile Rocher—La Province Chinoise de Yunnan.

General. The Army Book of the British Empire.

Articles and lectures in the "Journal of the United Service Institution of India."

Appendix A.

Précis of information concerning the African and Arab troops in the African Cavalry Guard, Hyderabad.

1. The regiment consists of Abyssinians, Somalis (recruited in Aden and including Aden Arabs), Zanzibaris, Nubians (Sudanese), and Movulluths (the latter being country-born).
Composition.
2. No special term of service. Pay of sowars, Hali Sicca rupees 15½, naiks 20½, havildars 25½, jemadars 50; free uniform and quarters.
Terms of enlistment.
3. They marry in India, and never trouble about getting up their own caste women.
Wives.
4. It is not easy to get them, consequently the regiment is largely recruited from sons of the men, or Movulluths.
Difficult to get.
5. They make good soldiers, but must be commanded by Europeans only, and are a fighting class.
Fighting qualities, etc.
6. Drink is their chief defect, but not to a serious or detrimental extent. They are all Muhamadans of the Sunnuth Jumnaath.
Defects.
7. There are three squadrons of African Cavalry Guards, consisting of 466 men. The Maisaram Regiment of the Hyderabad service. Infantry, 1,132 strong, is composed of Arabs and Rohillas. The irregular troops include 5,800 Arabs and 44 Africans. Most of these latter are merely of Arab descent.

Appendix B.

Return showing crimes committed in the African Cavalry Guards (Hyderabad) from January 1887 to December 1896, and the percentage for the ten years.

Disobedience.	Theft.	Fighting or quarrelling in barracks.	Drunk.	Trespassing.	Absence without leave from drills and roll calls.	Assault.	Disrespectful.	Dacoly.	Ill-treating horses.	Carlessness.	Gambling.
17	8	20	71	2	105	6	11	1	2	12	1

Percentage for the ten years = '08.

Appendix C.

The more warlike of the South African races.

The strength of the Zulu Army before the war of 1879 was estimated at between 40,000 and 50,000 men.

There are some 161,400 Zulus in Zululand proper and also a considerable number in Natal.

In the early part of the present century Mosilikatsi, the founder of the Matabele nation and one of Dingaan's Indunas, revolted and fled with his regiment to the north-west of Zululand. He was fought by Dingaan, but always beat him off. In 1837, Mosilikatsi came into collision with the Boers, and, being defeated by them, moved further north in the direction of the Zambesi, and finally settled to the north of the Limpopo river.

The original Zulu stock was recruited from the neighbouring tribes, and the success with which Mosilikatsi formed a people out of the most unpromising materials, and imbued them with his own martial spirit is very wonderful.

The Matabele consist of three classes—

- (1) The Abezansi, consisting of the Zulus, who came up with Mosilikatsi, or their descendants.
- (2) The Abemhla, Bechuanas taken prisoners, as children, during their way up and incorporated in the tribe.
- (3) Maholi, captured during their constant wars with the Mashonas and Makalakas. These latter are nominally slaves, but are practically their own masters.

The army deteriorated very much after the incorporation of the Maholi element, losing the discipline and dash of the old Zulu warriors.

The Matabele highlands extend for about 180 miles from north to south, and for about 150 miles from east to west. The population was estimated, in 1891, at between 150,000 to 200,000. The army, in 1891, was about 15,000 strong and was composed of 20 regiments. This force was grouped into four divisions, after which the four divisions of the country were named, *viz.*, Amabuto, Amagapa, Amhlope, and Amakanda.

The Swazies are located to the east of the Transvaal and on the borders of the Portuguese territory of Delagoa Bay. Although of Zulu origin, they are not such a fine race physically, and their warlike instincts do not appear to be so strongly developed. Levies of Swazies, however, did us good service in the operations against Sekukuni and on several occasions since.

The Basutos were originally composed of the remnants of many broken Kafir tribes, who were united during the first half of the present century by King Moshesh. The native population of Basutoland was 127,323 in 1875, but it is now considerably greater. There are over 12,000 Basutos in Transkei and about 1,600 in Zululand.

The Basutos do not love fighting for fighting's sake, and they have never attacked their neighbours without provocation; but they

are not unwarlike, for they have beaten all the tribes which have attacked them, and many of them have fought well as levies in the colonial campaigns.

Speaking of the battle of Ulundi, Captain Montagu says* "The pluckiest of our allies were the Basutos, and they were delighted with the battle. They sat on their tiny ponies inside the square when the firing went on, dodging from side to side to watch the effect of the shots."

The Basutos have many good qualities, but unfortunately they are confirmed drunkards.

Appendix D.

Précis of information concerning Malays and Dyaks.

The Dutch employed Malay soldiers in Bengal in 1759, and Occasions when employed as soldiers. subsequently in Ceylon. The Portuguese are also stated to have employed them in the Goanese wars.

The Ceylon Rifle Regiment, of about 1,000 men, was principally composed of Malays, and had the reputation of being a very smart and well-disciplined corps. It is said to have been disbanded on account of the large amount of transport which it required. As it had 94 British officers, this is not difficult of comprehension !

At the present time there is a company of Malay Engineers at Singapore, and the Sarawak and British North Borneo Police are partly composed of Malays and Dyaks.

Mr. John Crawford, who was for a long time the British Resident at the Court of the Sultan of Java, was of opinion that the Malays were seldom wanting in individual courage, and that, if supplied with the confidence which springs from discipline, they would make formidable enemies.

Mr. A. R. Wallace describes the Malays as short in stature, but very strong, active, and hardy, quiet and undemonstrative in character, and deliberate in speech. He says that, with all the ease and dignity of Europeans, they combine a reckless cruelty and contempt of human life.

Mr. H. Sinclair of Bangkok, who is intimately acquainted with the Malays, believes that English officers, who could speak the easy Malay language, would have no difficulty whatever in securing as many good recruits as they wanted. He recommends Penang and Singapore as recruiting centres, with depôts throughout the Native States, and he considers that the finest men will be found in the Tringganu State, which is situated on the coast between Bangkok and Singapore. An opinion as to the capabilities of the Malays for military service, expressed by a Royal Engineer officer, will be found in Appendix.

* Campaigning in South Africa, page 239.

Before Sir J. Brooke's arrival the coast Dyaks were professional Dyak Head Hunters. Together with the Illanos of Mandanao, the pirates of Sooloo, the Balignini, and the Malays, their neighbours, they infested the seas of the Archipelago. They faithfully supported Sir J. Brooke during the Chinese mutiny in 1857. They now occupy themselves with agriculture, but remain a militia, always ready to respond to the first appeal of the Raja. The Dyaks of the interior are peaceful cultivators.

In a very exhaustive account of the Dyaks,* which has recently appeared, the author describes the head hunter as an arrant coward: "The head of a child or of a woman is as highly prized as that of a man; so, as easier prey, the cowards seek them by lying in ambush near the plantations." This view is corroborated by Mr. Carl Bock,† and also by the official hand-book of the British North Borneo Company.

An opinion, founded on actual experience of the capabilities of the Dyak for military service, is given in Appendix,

Of the Dyaks of Borneo, the Balignini, Illanuns, Bugis, and Sooloos, all Muhamadan races, would appear to be the most suitable for enlistment.

Appendix E.

Extract from a letter written by a gentleman who has been for many years in the service of the Raja of Sarawak.

* * * * *

The Dyak, as a fighting animal in his own jungles, armed with spear, shield, and sword, is plucky enough, his mode of warfare being lying in ambush and making a sudden rush.

They do not fight well in the open, which is natural, as they have had no training for it, and I have never found them stand against fire-arms.

The Dyak is small, thickly made, very lithe and active, and takes readily to military service, learns his drill quickly and looks smart on parade, and has often called forth admiration from naval and military men who have seen him go through his drill.

But there it all ends; take those men, as I have, on active service, discipline is thrown to the winds, and they become a rabble of excitable savages, deaf to any word of command, firing off their rifles in the air or anywhere, so as to draw forth the remark from me more than once that I would be far safer amongst the enemy than amongst my own men. Taken away from his jungle and stationed in the town, the Dyak loses all his activity and powers of endurance, and becomes soft, slack, and lazy, and knocks up on any hard work.

I have just been inspecting the North Borneo Police in Sandakan. They have been put into boots, and are mightily proud of themselves; but in the last month or so they have sent some on active

* "The natives of Sarawak and British North Borneo," by H. Ling Roth.

† "The Head Hunters of Borneo."

service into the jungle, and they proved quite useless. They could not get about in boots, and when they took them off they were laid up with sore feet, and unable to march. Give me 20 Malays and I will lick 100 Dyaks with civilised weapons. In the jungle, with his own outfit, I give the Dyak the *pas*.

Appendix F.

The Singapore Company, Royal Engineers.

(From information supplied by a Royal Engineer officer.)

Composition. Fifty Malays, twenty-two European non-commissioned officers.

Rates of pay.	Regimental pay—
Havildar-Major	66 cents* per diem.
Havildar	41 " " "
Naik	30 " " "
Sapper	27 " " "

Engineer (working) pay—

1st rate	28 cents per diem.
2nd "	20 " " "
3rd "	14 " " "
4th "	7 " " "

The majority of the men are on the second rate of Engineer pay.

Terms of enlistment. Men enlist for five years, and can re-engage for ten years, *i.e.*, five years more, and again for fifteen.

Men discharged after ten years' service receive one year's pay as gratuity. After fifteen years' service, 1½ years' pay as gratuity.

The average height is 5' 4", chest measurement, 33". The physique is fairly good for their size, but it is difficult to get much hard work out of them.

Physique. The best recruits come from the Native States, particularly from Tringganu and Kelantan. The Singapore Malay is undersized and somewhat weakly as a rule.

The "caste" is not very high. They have no objection to eating food cooked by Europeans, etc., provided the food itself is not "unclean." The fact of their being Muhamadans has the advantage that cases of drunkenness never occur.

Caste. On the whole, the Malay does not make a very good soldier, being by nature lazy and almost impossible to make a good "drill" of. They are, however, excellent boatmen as a rule, which is a great consideration for the work of the Singapore Submarine Mining Company.

Military value. They would probably be loyal and work well in case of active service, but the amount of work they can do, compared with a European Company, is small.

* One dollar = 100 cents = not quite Rs. 2.

MULE LITTERS AND DOOLIES.

BY SURGEON CAPTAIN BRUCE SETON, INDIAN MEDICAL SERVICE.

In a recent number of this Journal I endeavoured to point out that, when employed with bodies of cavalry in the field, our existing system of ambulance transport would certainly fail; and that, instead of fulfilling its *raison d'être* of being at hand to pick up and carry sick or wounded men, this transport would be, to a large extent, if not entirely, conspicuous by its absence.

The cause of such inevitable failure is not far to seek. There is nothing laid down in the Equipment Tables to lead one to believe that the Field Hospital arrangements for a cavalry force differ in any particular from those that obtain for the service generally; in fact, the important factors of pace and distance covered, which are inseparable from a proper estimation of the requirements, have been absolutely ignored.

It is indeed evident that the dooly train of the Field Hospital would be quite unable to keep up on the march with a cavalry force; and if distances of, say, 30 miles were covered for a few consecutive days, it would be hopeless to expect this train to cover such marches at all. So that in the event of a skirmish during the course of the day's advance, there would be absolutely no means of dealing with casualties. The same reasoning obviously applies to the more common eventuality of a man being suddenly incapacitated from illness or accident.

The fact of 80 riding mules being supplied to each hospital in no way really helps matters, although such mules would be able to travel faster and further than the dooly; for, if a man is not able to ride his own horse, he will be equally incapable of riding an ambulance mule. So that the whole 80 mules might as well be absent.

Taking the above into consideration, I suggested the introduction of mule litters in place of doolies; and of cacolets in place of "riding" mules.

The financial aspects of such a substitution were dealt with at some length; and it was shown that not only would there be no increase in but an actual saving of expenditure.

But these remarks are not by any means restricted in their application to the mounted branches only, or rather to Field Hospitals accompanying a mounted force.

They apply as well to the ambulance arrangements of any force, however constituted, though certain of the factors in the problem, such as the rapidity of movement of, and long distances covered by, the main body, are not so apparent, and lose part of their urgency where infantry is concerned.

To a different degree, but on the same grounds, a dooly, especially when laden, is as unfitted to accompany infantry on the march as it is to accompany cavalry.

It must be a matter of common experience that the regimental dooly is invariably absent after the first half hour, being utterly incapable of keeping up. And this applies equally to the dooly train of the Field Hospital. The rate of progression of an unladen train on rough ground is appreciably less than that of infantry; and this is recognised in the invariable rule that the Field Hospital marches just ahead of baggage. Once the doolies begin to fill up, however, the pace probably does not exceed that of camel transport; so that either the whole Field Hospital has to slacken its pace and give up any sort of touch with the main body, or, as is usually the case, the laden doolies must be allowed to drop more and more to the rear and ultimately get lost among the baggage.

Any scheme, then, which may be considered necessary in view of the mobility of a cavalry force, must be extended for the same reasons to embrace the ordinary conditions obtaining with a mixed or infantry force.

The scheme now recommended involves the abolition of the dooly altogether as a means of transport of sick, and the substitution for it of *some sort* of mule litter.

It is not denied that on a flat road a dooly can travel at a fair pace and without any great inconvenience to its passenger, provided always that the dooly-bearers know their work,—in other words, provided the bearer is a kahar, and not any sort of riffraff swept into Government employ from the purlieu of a city and called a kahar. The old type of kahar is increasingly difficult to obtain in sufficient numbers, and the so-called kahar of war time may be and often is any sort of bazaar loafer in times of peace.

But as a means of transport in an enemy's country, in hilly or bad ground, the dooly is an anachronism, and a dangerous one. And this seems to be universally admitted.

It has fallen to the lot of most officers at some time to be on convoy duty with sick; and it is difficult to understand how, in face of this common but unpleasant experience, the dooly has been permitted to remain so long as it has. It must be admitted that it is impossible to keep a line of doolies together; the perpetual halts to "change shoulders," the frequent stumbles and occasional falls, the often recurring intervals of rest required by the bearers, and above all the irregularity of pace of individual 'teams,'—all these result in the inevitable tailing out, which is the curse alike of the medical officer in charge and of the officer responsible for the safety of the column. To the patient too the journey is the acme of discomfort.

The jolts communicated to him at every stumble, the constant anticipation of a fall, dooly and all (this anticipation being often realised), and the surprising oscillations, cumulative in their nature or effects, of which a dooly is capable,—all these combine to make the lot of the patient an unhappy one.

There is yet another point of view from which to regard the dooly, especially when the country traversed is rocky and cut up. It is absolutely defenceless; and it offers the best possible target for an enterprising marksman to fire at. Unless a guard is told off to each, there is nothing to prevent a single swordsman rushing a dooly and cutting down the bearers and the patient. It is true the latter accident does not appear to have actually occurred, but there is at least an appreciable risk of its doing so; and the presence of a guard at the front and rear of a tailed out procession of doolies "in column," with 100 yards intervals, would be of no avail to prevent such a rush.

Other objections to the dooly will be dealt with later in discussing objections supposed to attach to the alternative method of sick transport.

At least it will be conceded that the unwieldiness of the dooly column, the expense of maintaining 130 bearers in each Field Hospital, and the inefficiency or rather the inability of these bearers to perform the very duties for which they are maintained are beyond question. And it is now necessary to consider the alternative scheme of mule litters more at length. The desiderata for any form of ambulance transport intended to accompany troops on service are summed up in two essential features—mobility, and construction suitable for the easy and safe carriage of a sick man.

However suitable in other respects, any system of ambulance must fail which is unable to be present whenever and wherever wanted. And the stretcher, dooly, litter, or whatever apparatus is employed must keep absolutely in touch with the unit to which it belongs, and which it is designed to serve, if it is to be of any practical use. To attain the degree of mobility necessary for this, questions of comfort must to a large degree be sacrificed. No amount of ingenuity will make the lot of a sick or wounded man on service anything but unpleasant; and while this condition can be ameliorated to a certain extent by judicious transport, much must be sacrificed to the exigencies of the service.

It is obvious that, for the class of country into which our frontier campaigns take us, wheeled conveyances of any sort are impracticable. Hand-stretchers too are limited in their applicability, and could never be used to carry men for any distance; moreover, they would have all the disadvantages of the dooly. So that mule transport is the only alternative. Mule transport consists of litters for lying-down cases, and cacolets for those which can sit up. It is not proposed to enter on the subject of cacolets here, although they are in every way preferable to the "riding" mules at present employed.

Hitherto the litters employed in our own and foreign armies have invariably been employed in pairs, slung from a transport saddle, one on each side of the mule. No attempt has yet been made to introduce a top-load litter to be carried, singly, on the back of a mule like the section of a gun.

Litters were first employed by the French in Algeria and "were only designed for use in mountainous country "where there are no roads practicable for wheeled conveyances, and where the distances are too great for transport "by hand-stretchers."—(Longmore.) The French found them a success, and, to quote again from Longmore, "no less "an authority than Marshal Bugeaud was led to say that "Algeria could hardly have been conquered without them " Finding them of such value . . . the "French subsequently adopted them as the principal form of "their ambulance transport for general service."

We employed them extensively in the Crimea, where they were found to be "very useful along the narrow ravines leading up from Sevastopol."

Of recent years we have not made much use of them; though during and after the Egyptian Campaign they were

largely employed in Cyprus to carry our sick up to the sanitarium on Mount Tvöodos. Both litters and cacolets were used, and there was no reason to be dissatisfied with either method of carriage.

Up to the present time they have not been introduced into this country; no mention even is made of them in Army Regulations, India (Medical), or in the Equipment Tables; they are merely ignored. No definite reasons are ever assigned for this; but it is generally imagined that there are certain fatal objections to such a means of transport, as far as this country is concerned,—objections which are mere matters of tradition, and to disprove the force of which no attempt has been made.

By dealing with these supposed objections one after the other the best insight into the whole system of mule transport is obtained; and it is proposed now to go into these at some length, making a comparison of the dooly and the litter, and recognising that the cacolet is a logical sequence of the litter.

Objections to the Litter.

1. The only really serious objection to the litter is the question of weight; and it must be admitted that, by the possibility or impossibility of overcoming this difficulty, the whole system of mule transport must stand or fall.

The Regulation Mark III litter is carried in pairs, slung by hooks from the saddle of the mule. A pair of litters weighs 106 lbs., exclusive of saddlery, which may be taken as 70 lbs. Supposing each litter to carry a man weighing 11 stone, or 154 lbs., then the total weight to be carried by the mule will be $106 + 70 + 308$, or 484 lbs., or about 6 maunds. *Could enough mules, or indeed any mules be found to carry such a weight over bad ground, and for long distances?* This objection may be met in several ways—

(a) If the mules in Algeria, the Crimea, and Cyprus could carry the weight so successfully that both the French Government and ourselves have definitely adopted the litter for military purposes, as a result of experience, why should not mules be able to do so in India?

(b) A box mule in a Mountain Battery carries all told 375 lbs., and this, day after day for distances up to 30 miles if necessary, over any sort of ground, and irrespective of the existence of roads. He is undoubtedly a fine stamp of mule,

but not as good as the top-load mules. The litter mule, would rarely, if ever, have such long distances to travel when laden; and he would have far more 'off' days than the battery mule. When employed as part of a Field Hospital transport, he would in most cases be able to have occasional reliefs, with the unladen mules of his unit.

(c) Take, as another example, the mules at present actually employed in the Bengal Cavalry—at least such of them as are the property of the regiments and not Commissariat animals.

These mules are used in peace for grass-cutters purposes, but on the march they are intended to carry regimental baggage, in the proportion of one mule to every two sowars. The total load carried, consisting of tent, men's kit, line-gear, spare horse blanket, men's cooking utensils, etc., is supposed to amount to 280 lbs., or $3\frac{1}{2}$ maunds. Added to this load the syce almost invariably gets up on top of the whole. This brings the total weight to very nearly 5 maunds, even if only the Field Service scale of necessaries is rigidly adhered to by the men.

The mule thus laden, *i.e.*, with the syce up, actually makes better going than when merely marched in strings after the fashion of ordinary transport. From the animal's point of view this is comprehensible, as he remains a shorter time under the load. It is surprising how these cavalry baggage mules keep up with their regiments; in fact, as far as "the walk" is concerned, they go faster than the regulation rate of the latter.

These mules are purchased regimentally; with reasonable care they can be obtained for from Rs. 140—160, provided of course, as in all remount buying, there is no intermediate agency between buyer and seller to increase the price. The animal is not supposed to be up to the stamp of the battery mule, the difference in price being an obvious reason, but he is greatly superior in every way to the second class Commissariat mule, which costs more than the above sum.

If such a mule, purchased for Rs. 160, and fed on some two seers daily, is able to go on day after day carrying enormous loads either of grass or baggage without breaking down unduly often, there can be no reason why a litter mule of the Mountain Battery type should be unable to carry his six maunds on the comparatively rare occasions when this would be necessary.

The type of mule suggested as essential for carrying litters, however, will be dealt with later.

(d) It would obviously be useless to put 484 lbs., or 375 lbs. for the matter of that, on the diminutive creature usually supplied by the Commissariat Department for "ambulance saddle" work. Such an animal would probably be unable to stand under the weight. So that no doubt a special class of mule would be required. This is admitted; and instead of these undersized weeds costing some Rs. 200, mules costing about Rs. 500 and of the same class as the Mountain Battery box mule would be required. The dooly establishment of a Field Hospital costs Rs. 1,418 a month to keep up; by abolishing this establishment and substituting ten mules and ten drivers at a cost of Rs. 240 a month, there would be a monthly gain of Rs. 1,179; and this sum continued over a period of six months would amount to a total saving on pay and keep of establishment of each Field Hospital of Rs. 7,068,—more than enough to purchase the whole ten mules required out-right. This calculation may be tabulated as follows:—

Comparative costs of Dooly and Litter Establishments in six months.

	Rs.		Rs.
Cost of free kit for 129 kahars at commencement of campaign at (roughly) Rs. 3 a head	387	Cost of free kit for ten drivers at commencement of campaign	30
Pay for six months at an average of Rs. 8 a month (including batta)	6,192	Pay of ten drivers at Rs. 9	540
Cost of free rations at Rs. 2-8	1,935	Cost of free rations for drivers at Rs. 2-8	150
Total	8,514	Rations of ten mules at Rs. 12	720
Or a monthly average of	1,419	Total	1,440
		Or a monthly average of	240

There is, therefore, no reason why the very best stamp of mule obtainable should not be employed. And there should be no greater difficulty in getting a sufficient number than there is at present for the Mountain Artillery. If India cannot produce the mules, the price quoted should cover the cost of importing suitable ones from abroad.

(e) If the objection of weight be still regarded as insuperable, and the Indian mule be proved to be incapable of carrying the load, an alternative scheme may be adopted, *viz.*, placing only one litter on each mule, and this, as a "top-load," in the same manner as the section of a mountain gun is carried. In this way the weight to be carried, though

placed far more disadvantageously, would be proportionately diminished.

Up to the present this method has never been employed. Further on in this article drawings and description of a suitable saddle and litter are given, and trials are being carried on.*

2. It is asserted that if the litter mule comes down, the patients in the litters will have a bad fall. This is of course perfectly true; but it is anticipated that a mule up to the weight will not come down any more frequently than a Mountain Battery or Cavalry Baggage mule, which is practically never.

In any case it cannot be said that the dooly is free from this objection. Personal observation on the road from Makin to Jandola, which was not bad enough to bring down horses or mules, led me to give an average of two falls a mile to each laden dooly in the convoy. It would be instructive to know how many serious cases have taken a fatal turn as a direct result of dooly carriage. Without statistics to fall back upon, this is largely a matter of opinion; but every Frontier Expedition affords numerous instances, and every medical officer must remember cases of men, wounded or seriously ill, whose death or relapse has been distinctly traceable to the incidents of a dooly journey. The classical case of Stonewall Jackson, who was killed in this way, is one in point. He was thrown from a stretcher, and died of the results of severe concussion of the chest. The fact that in this case a stretcher was employed to carry him, and not a dooly, makes no practical difference.

When a dooly is carried over boulder strewn ground the fore and rear bearers are constantly on different levels, and the weight is thrown on them in proportionately varying degrees. A stumble on the part of one man is very liable to trip up his fellow, and then the whole machine collapses. As the bottom of the dooly is made of canvas, and the projecting corners are very small, the patient's body strikes the ground extremely hard; and as a result of the jar the heavy pole tends to come down on to him as well.

The dooly then is probably in practice a far more dangerous means of progression than a mule litter.

*NOTE.—It seems likely that the true solution of the problem of sick transport in war lies in this top-load litter, or in a modification of it. The same prejudice which appears to exist universally in India against the side litters will certainly be found to exist against the introduction of this system. Considerable modifications will probably be required before the litter and saddle as now recommended are mutually perfectly adapted to each other, but this is only a question of detail.

3. The motion of a litter is peculiar. It is a sort of pitching motion, and is said to produce feelings akin to sea sickness. Moreover, a litter is necessarily cramped in regard to accommodation. Here again comparison with the dooly is not altogether in favour of the latter. The swing of a dooly on rough ground is extensive and unpleasant. Owing to the length of line covered by it and its bearers, it is rarely horizontal; consequently in addition to the swing there is also a pitch. Again the useful accommodation of a dooly is very little greater than that of a litter.

4. In ascending or descending slopes the patient would tend to be thrown out of the litter. This tendency can be compensated for to a great extent, as will be shown. Considering, too, the hapless position of the passenger by dooly under like circumstances, this objection is absurd. Here again the effects of the slope are exaggerated by the distance between the pairs of bearers. And proportionately to the difference in length of the dooly as a whole and of a mule, the tendency to slip backwards or forwards will be increased. Moreover, the countless drawbacks which attend the dooly on the flat are increased to a disproportionate degree on a slope. When the ground is covered with loose stones, it is almost an impossibility for the rear bearers to keep on their feet; and although the spare bearers can assist in the work, the liability of one man tripping up and bringing the whole team down is enhanced by increasing the team. Moreover, as the bottom of a dooly is flat, there is nothing to prevent the patient slipping as a whole to the dependent part.

5. The narrowness of mountain roads is said to be a drawback to the employment of litters. A mule, laden with litters, is very little wider than a mule carrying any other type of baggage, and certainly far less so than a camel. So that this objection has no special significance.

6. The mules would require a special training in time of peace; otherwise serious accidents might occur by the animal refusing to stand, kicking, or running away; and this training implies keeping up a special establishment at all times for the purpose. In the first place it is not intended that a raw mule should be employed for litter purposes; and if the system be adopted it will be necessary that the peace training be as thorough as that to which Mountain Battery mules are subjected. If it is found necessary to have perfectly trained animals for artillery purposes, it is of course

equally necessary for ambulance purposes. The objection therefore, if objection it can be called, must be allowed. Curiously enough the present system, by which untrained bearers and ambulance riding mules are supplied to Field Hospitals by the Commissariat Department, is truly a warning in this respect. The bearers are never trained at all. Beyond being allotted to doolies, no attempt at any sort of instruction is given to them; and they are supposed to be qualified, not only to carry a dooly, but to lift a sick or wounded man into and out of this conveyance,—in fact to perform the duties for which in Europe highly educated and specially trained bearers, such as the Medical Staff Corps, are maintained. The riding mules again are in no way fitted for the work. It is laid down in Regulations that they are to be 'quiet.' On the contrary, for their size they possess more original vice than any other class of animal. It would indeed seem that they are sent to Field Hospitals to be broken. Mounting such a mule is usually a gymnastic feat for a sound man; but for a man who is feeling ill or has hurt himself, and who is perhaps quite innocent of any knowledge of equitation, it is almost an impossibility. Once in the saddle, too, the unfortunate patient's troubles have frequently only just begun. There is no need to cite instances of men being thrown and dragged, as they will occur to the mind of any one who has seen the Field Hospital mule on service.

As a matter of fact litter mules could be well trained all the year round by attaching them to regiments and Station Hospitals, and by regularly employing them on reliefs in place of doolies. Better than anything would be a Field Hospital training dépôt in every Command, where the animals and their drivers could be taught the work, and a sufficient staff of men instructed in First Aid. This involves a scheme too large to be dealt with here.

7. When only one litter is in use, there is a tendency for the saddle to slip round and gall the mule. This objection, though admitted, does not appear to give much trouble. Girthing up tight, and using "balancing straps," overcome it to a great extent; and if necessary the driver's weight must be used as a counterpoise. In practice, too, in Field Hospitals it will usually be the case that more than one man would have to be carried on the march; so that, out of the whole establishment, only one mule would be in the position of having an unladen litter on one side. This objection is further dealt with below.

8. It is said that even if litters were generally introduced as ambulance transport that a certain number of doolies would have to be kept up, for "serious cases." There is absolutely only one argument in favour of this proposal, and that is this, if a man is very ill, or has an injury which necessitates complete absence of movement in the affected part (*e.g.*, a fractured thigh), the dooly can be used as a bed, and the patient need never be moved off it at all. This is true; but the whole point in argument is, not whether the litter or the dooly is the more comfortable bed when deposited on the ground, but which is the more generally serviceable means of transport. It can be little satisfaction to a man with a broken thigh to know that when once he reaches camp he will have the bottom of his dooly to sleep on without being moved, if he has to look forward to several needlessly miserable hours of alternate jolting, pitching, and falling on the journey to his destination; and among the functions of the dooly that of serving as a camp bed may practically be disregarded, if it is seriously advanced as a reason for the non-adoption of the litter. In every other respect it would be difficult to prove that the dooly is more suited to the "serious case" than the litter. Any "serious case" on service, or rather on the march, is *ipso facto* severely handicapped; and it is probable that a tabular statement of "serious cases" submitted to dooly transport in any of our recent campaigns would tend to rob this transport of its supposed advantages. This, however, is a matter of opinion.

9. The question of expense has been dealt with.

10. Within the last few weeks the litter has been abolished in the British Army, and it is argued from this that experience has shown that it is not a necessary article of equipment. This is of course a fallacy. It is quite conceivable that in a European war the existence of railways and of roads practicable for carts would render litters unnecessary as a means of transport. This does not, however, in any way detract from the advantages of the litter over the dooly; and so long as our warfare is carried on in mountainous countries and with savage nations the choice must lie between one or other of these systems, no matter what system may be adopted for civilised warfare.

Such then are the objections commonly urged against the litter, as an alternative to the present system. All of them are traditional, few practical, and some sentimental.

To an impartial observer it would appear that if fatal to the one they are equally so, if not more so, to the other. As a matter of fact, perfection cannot be hoped for in any system; each has its peculiar intrinsic disadvantages; and although mule transport has not been fairly—has not indeed been at all—tried in this country, the dooly has surely been weighed in the balance and found wanting.

A new pattern Side-litter.

If doolies were abolished, the Mark III pattern litter would be introduced.

But there seems to be no reason why this pattern should be assumed to represent finality in the process of evolution of the litter. It is possible to get perfectly satisfactory results with an apparatus weighing only half as much as the Regulation pattern, and possessing the additional important advantages of greater simplicity and cheapness.

In the attached drawings are shown plans of a new pattern side-litter designed to meet some of these requirements; and although no claim is made to perfection of design or construction, the results of experiment seem to show that there is a good deal of room for improvement in the Mark III pattern, and that the new pattern, to some extent, is characterised by the presence of these improvements.

Up to the present only unofficial trials have been made, the results of which are given; but it is hoped that the litter will shortly be tried under service conditions.

The litter consists of a framework of iron wire, varying in thickness, according to the strain to be borne, from one-third to half an inch. The framework (see Figs. 1 and 2) consists of a stout longitudinal bar (Figs. 1 and 2 A) forming the axis of the litter, and two rather slighter lateral bars (B, C) articulating with the axial bar at the two extremities, and thus forming the sides of the litter. The space enclosed by these bars, as shown in the plan, is coffin-shaped, and measures 6 feet 6 inches in length; and in breadth it varies from 22 inches at the head end to 16 inches at the foot end.

At the two extremities of the axial rod, the lateral bars are attached by being bent over, so as to form a simple sort of hinge; and the whole litter can thus be folded up flat when not in use. These hinges, as indeed all the articulations in the litter, present no sort of complexity, and there is nothing in them which could possibly get out of order.

25

A diagram of this hinge is shown in Fig. 4. From the lateral rods, four pairs of flat arches pass to the axial rod (1, 2, 3, 4), completing the framework. These resemble the ribs of a boat in structure and function. They occur at intervals of 18 inches apart. They are not intended to bear the weight of the patient, though they prevent the framework opening under this weight.

Both the axial rod and the two lateral rods are bent upwards slightly at a distance of 2 feet from the head end, thus giving a slight upward inclination to this end of the litter. By this means the tendency for the upper third of the patient's head to become dependent, under the influence of gravity, is overcome; and a greater degree of comfort is ensured than would be the case if the axis of the litter were quite horizontal. This modification has been introduced as a result of experiment.

The canvas, on which the patient lies, is bound with leather containing eyelet holes, and laced to the lateral bars. It has been found necessary to have lacing, as the canvas tends to sag with use, and requires tightening up occasionally to prevent the patient's body coming into contact with the 'ribs' or axial bar.

Passing across the litter, and connecting the two lateral bars (and therefore forming three arches over the patient), are three arches made of flat iron, 1 inch wide. These "transverse arches" (D, E, F) have two functions; they support a hood and coverlet over the whole length of the litter; and they overcome any tendency on the part of the litter to close under the weight of the patient. The latter, in practice, is inappreciable, as experiments with a dynamometer show; but when closed and in position the litter cannot close up, no matter what weight is put into it.

Each arch is composed of two segments, each forming roughly a quadrant. Each quadrant is articulated to one of the two lateral bars by the simple hinge already described above; and, in the case of each arch, the quadrants meet each other in the middle line, and lock by a simple arrangement consisting of a nut in one which fixes into a slot on the corresponding segment. This locking is performed when the patient has been placed in the litter, and before the operation of lifting on to the mule.

The arches thus formed are of different heights; the one nearest the head, at a distance of 26 inches from the anterior end (D), is about 15 inches above the canvas; the arch

nearest the foot of the litter (F), 12 inches from the posterior end of the latter, is 12 inches above the canvas; and the median arch (E), occupying a position 28 inches from the foot end, is about 14 inches above the canvas (see Figs. 1 and 2).

The litter is attached to the hooks of the Regulation Pack Saddle by means of rings fastened to the inner lateral bar. The foremost attachment (G) consists of two links only, and lies just beyond the "head arch" (D).

The hinder attachment (H) consists of four links, and lies 12 inches further along the litter. This chain is 2 inches longer than the first, and this ensures the lower extremity of the patient remaining constantly at a lower level than his head.

In ascending a very steep slope, the rear hook on the saddle can be attached to the first link of this chain; and the tendency for the patient to slip feet first out of the litter is considerably diminished.

It is found, as a matter of experience, that the heaviest part of the patient is his upper third; and the litter tends to be "down by the head" in consequence. This tendency is overcome by the bend upwards given to the whole framework of the litter, and to the chain nearest the head end being 2 inches shorter than the other.

In order to ensure the litter remaining perfectly horizontal, it is necessary that it should take a bearing from the whole length of the panel of the saddle. To effect this the following arrangement has been made (see Figs. 1, 2, and 3).

A pair of stout arches (X and Y) pass vertically downwards from the inner lateral bar for a distance of 10 inches, and then curve directly outwards to the central axial rod. The foremost of these arches is situated at a distance of 26 inches from the head end of the litter, and the hinder arch at a distance of 12 inches further back. These two arches are connected by a flat wooden panel, 3 inches wide, which bears against, and coincides in length with, the panel of the saddle. This panel distributes the pressure of the litter over the surface of the saddle.

The materials employed in the manufacture of the litter can be obtained in any bazaar. The total cost of a pair, exclusive of labour, amounts to Rs. 14. Owing to the absence of true hinges, there is nothing to get out of order; if the bars bend, they can be easily straightened; and any *mistri* could mend or replace any part of the apparatus with material procurable anywhere.

The total weight of a pair of these litters, inclusive of hood, coverlet, and pillow, is just under 50 lbs. In the case of the Mark III pattern, the corresponding cost and weight are £12 and 106 lbs. respectively. The litters can be readily attached to a camel palan if necessary.

As regards harness of the litter mule. It was found in Cyprus that the pressure of these heavy loads on the saddle was very readily communicated to the mules' ribs, and that galling resulted if the stuffing of the panels was not carefully attended to.

When empty, the transverse arches are unlocked, the litter closed, and the inner halves of the arches pushed between the edge of the canvas and the outer lateral bar. In this way the litter remains compact, and does not rattle when the mule walks.

Result of trials.

I have tried the litter very fully, and it seems to answer to all practical requirements. Even when laden and placed on a very inferior stamp of mule, it does not appear to distress the animal.

The movement imparted by the mule's action is very small, certainly not more than that of a dooly under good conditions.

In ascending and descending very steep slopes, 1 in 1, the patient is not thrown about so much as he would be in a dooly. I tried the apparatus on the ascent and descent of a slope sufficiently severe to bring down the mule. As a result of personal observation, the jar caused by the animal falling was not as severe as that caused by a dooly coming down; moreover, the litter sustained no damage. In the annexed report are shown the trials made by Surgeon Captain Melville, 5th Panjab Cavalry, to whom I am greatly indebted for many very essential alterations in the original design.

I need hardly say that mules untrained for the purpose, and men who have never had occasion to lift a laden litter before, have alone been available in these trials. To be fairly tried, both men and animals would require training; the necessity of careful lifting is obvious, if serious accidents are to be avoided. The laden litter has to be raised to the level of the hooks on the saddle, before the chains can be fixed; and this is an extremely difficult thing to do if the bearers do not lift equally and all together, and if the mule does not stand still.

REPORT ON TRIALS BY SURGEON CAPTAIN MELVILLE, 5TH PANJAB CAVALRY.

I had the litters tried on several occasions, both alone by myself and in presence of other people, and on different mules.

What every body says is that you will need special mules to carry such a load as two men. I think that is granted; it is a matter of mules not litters.

If you have mules big enough to carry the Regulation mule litters (Mark III), you could get them big enough to carry these; and any mule that can carry two men in cacolets could carry two men in your litters.

The litters at first sight appear ridiculously light, but trials and observations show that the framework is quite strong enough for all practical purposes. There is a considerable amount of oscillation when the litters are open and empty; but when loaded this is reduced almost to *nil*. At least this has always been the case when I have tried the litters.

I do not know if a belly band would be of any service in keeping the litters from movement; they seem to oscillate very little when laden, and the subjects I experimented with were comfortable enough, and said they were not shaken at all even when we made the mule 'step out.' When closed up, they are very compact and light; but the inner halves of the transverse arches should always be passed under the outer lateral bar, between it and the canvas, otherwise they knock against the mule and frighten it.

I kept in mind the following points in my trials:—cost, weight, and durability.

1. *Cost*.—They seem cheap enough; and if at the price you can combine the other requisites you have got all you require at a very low figure indeed.

2. *Weight*.—They are very light, much lighter than the Regulation pattern.

3. *Durability and strength*.—If the central longitudinal bar be strengthened, and the side supports connected by a wooden panel (these measures have been adopted—*B. S.*), the apparatus is as strong as you require, always supposing the material to be good. All the component parts of the litter are of the very simplest, so that it is not likely that things will go wrong as with a more complicated structure.

Of course they will break down under the strain of service; so will any other litter, or arrangement for carrying weights, such as men, when subjected to the continuous strain and

rough usage they get in the field ; so do the doolies and field stretchers now in use. But your litter can be mended by any unskilled *mistri* or *mochi* in a very short time, and will then be as strong as ever again.

I think, then, they combine lightness and simplicity with strength ; and their cost ought to recommend them.

As to their substitution for doolies *entirely*, I do not think this is feasible, though this is quite apart from the merits of the litters in question. If you are going to use mule litters for sick transport, I think yours are as good as any one wants, but I think you will always want one or two doolies for specially bad cases. I agree that the number of doolies could be largely reduced ; but at least one per section would be required for cases that might be injured by a restive mule, and cases that should not be lifted at all, *e.g.*, fractured limbs, dying men, etc., for you could not use your litters as beds, as the bottom of a dooly can be used in such cases.

A new pattern Single Top-load Litter.

The litters described above have been designed as an alternative to the more cumbrous Mark III Regulation pattern ; and the objections, which have been dealt with, apply—except in the matter of weight—to both equally. If litters are adopted instead of doolies there is no reason why the new pattern should not be equally serviceable as the Regulation pattern ; and its lightness is greatly in its favour.

But it is to be feared that, in spite of all the experience of ourselves in the past and of the French and Russian medical services, the possibility of a mule—no matter what stamp of animal—carrying a pair of laden litters will be generally accepted with incredulity ; and the known evils of the existing means of transport might be preferred to the unknown terrors supposed to be inseparable from mule litters.

Up to the present no serious attempt has been made to carry litters in any other manner than in pairs, slung from a Regulation saddle—that is, as a *side-load*. In dealing, above, with the objections urged against litters, it was pointed out that there was a difficulty in overcoming the fact that one litter of a pair cannot be used without its fellow, as the saddle tends to slip round. This can be overcome to some extent by using a 'balancing strap' passing from the laden litter, under the mule's belly and up to the saddle again on the opposite side of the animal, on exactly the same principle as the balancing strap which takes the weight and pressure in

the stirrup of a side saddle. But this is not satisfactory ; and, when there has been only one patient to be carried, it has been found necessary to put the driver into the unoccupied litter as a counterpoise. This difficulty naturally suggests the question whether a litter could not be devised which should be carried on the top of the mule,—in fact, like the top-load of a mountain gun.

If such a plan were feasible, not only would the difficulty of always getting a balanced load be overcome, but the whole question of overloading would be done away with ; for the severest critics of the carrying powers of the mule could scarcely find that the weight of the single litter, when laden, would seriously tax the powers of the animal. Moreover, there could no longer be any question of the narrowness of mountain tracks being an insuperable obstacle to the litter mule ; for wherever an unladen mule can go, there a top-load litter could be carried. There is no great difficulty in devising such a litter ; in fact, the one described above can be used without any alteration, and would thus be available for either top-load carriage or for the ordinary position. The essential is a suitable saddle, on which the litter shall rest, in the same position as the section of a mountain gun.

Such a saddle is shown in the annexed drawings, and will be seen to be merely a modification of the Mountain Battery type, specially adapted to carry a litter.

The saddle itself is an ordinary Regulation transport one ; this pattern was selected for convenience and because easily obtainable ; but it would be more satisfactory to have a special litter transport saddle with a tree specially made for the litter cradle (see Fig. 5).

The cradle consists of a front and rear arch (Fig. 5 D, E) ; each arch consists of two curved pieces of *kikar* wood, cut against the grain, dovetailed and bolted at the middle of their length to each other. The lower half of each arch is rigidly connected with the front and rear arches respectively of the saddle tree.

The corresponding halves of the arches are connected by stout wooden bars at their upper ends, which may be called the "upper side bars of cradle" (Fig. 5 FF) ; these bars are 30 inches long, and on them rest the sides of the litter ; the distance between the arches is 12 inches. At their lower extremities the arches are connected by smaller wooden bars, 12 inches in length (Fig. 5 H) ; these are the "lower side bars of the cradle" and merely assist in keeping the saddle rigid.

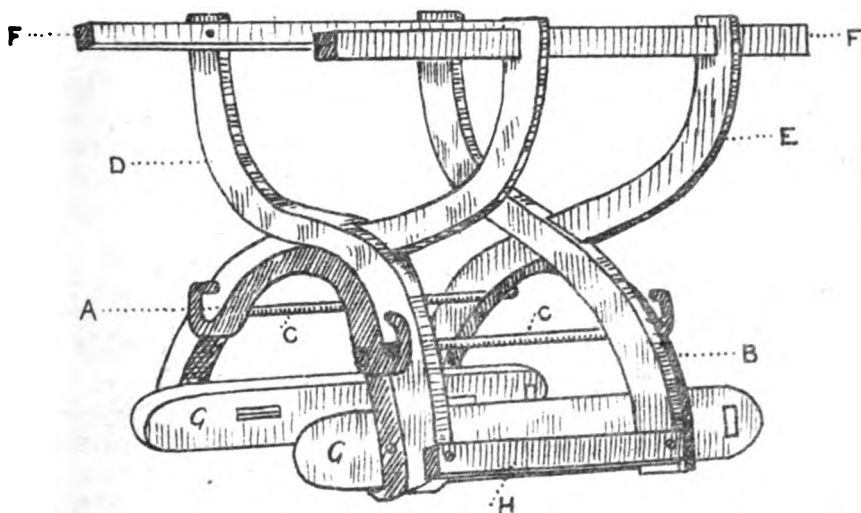


Fig. 5.—Top load saddle and cradle, stripped to show the method of attachment of the wooden cradle.

- A. Front arch
 - B. Rear arch
 - C. Bars
- } Forming tree of the ordinary transport saddle.
- D and E. Front and rear arches of the cradle. attached by bolts to the front and rear arches of the saddle.
 - F. Upper side bars of cradle connecting the arches of the cradle at their upper extremities, and forming a rest for the sides of the litter.
 - G. Side bars of saddle tree.
 - H. Lower side bar of cradle.

The litter lies in the cradle formed by the wooden arches and the upper side bars. The sides of the litter rest on the latter for a distance of 30 inches; and the longitudinal axis of the litter rests on the bottoms of the two arches, and is thus supported by them at two points, 12 inches apart.

The litter projects 2 feet beyond the cradle, over the withers and quarters of the mule. The bent axis of the litter carries the front portion clear of the mule's neck.

The harness is of the usual type, with breeching, crupper and breast plate, two girths and a surcingle over all. There is no risk of the litter slipping in the cradle, though in case the mule kicks the sides of the litter can be attached to the upper side bars of the cradle by means of a strap and buckle.

The cradle is 18—20 inches broad, and the litter fits it exactly. The weight of the cradle is 24 lbs. The litter is practically identical with the side-load pattern already described; only there is no necessity for the arrangement for keeping the side-load horizontal (see Fig. 2 X, Y), and by removing this the weight is reduced to 22 lbs.

Taking the weight of saddle and cradle together at 94 lbs., of the litter at 22 lbs., and of the average patient as 11 stone, the total weight to be carried will be 270 lbs. This is only 40 lbs. more than the ordinary Commissariat mule has to carry.

The cost of making and fitting the cradle to a transport saddle is Rs. 5, and the material employed, *viz.*, *kikar* wood, is obtainable anywhere. A village carpenter could make the whole thing in a day.

The top-load litter is now being officially tried. Private trials have shown it to be very satisfactory.

Résumé.

It is premised that, for many and sufficiently obvious reasons, the dooly is quite unfitted for the purpose for which it is intended, and should therefore be done away with.

The only alternative to dooly transport is some sort of mule transport. Hitherto the latter has consisted in litters carried as a side-load, and this system has long been in use in the continental armies as well as our own. The fact that they have been done away with in our army within the last few weeks is no argument against their employment in roadless countries.

The pattern of side-litter hitherto in use is heavy, cumbersome, costly, and difficult to repair on service. In this paper

are given plans and a description of a side-litter which has none of these failings; and the supposed disadvantages of all litters, of whatever pattern, as compared with the dooly, are dealt with at length—not to the advantage of the latter machine.

But there are certain drawbacks to the side-litter, even of the lightest pattern: of these the question of weight is the only forcible one. This difficulty has been greatly magnified; but, in view of the apparently universal opinion that enough mules of the Mountain Battery type cannot be procured for Field Hospital purposes, an attempt has been made to deal with the whole question of litter transport from a novel point of view, and accordingly the *top-load* system is recommended. Plans and description of a top-load litter and suitable saddle are given; pending the result of official trials, it is impossible to foretell the ultimate success or failure of the plan suggested; but there seem to be fair grounds for believing that the problem of sick transport in war in roadless and hilly countries would be as nearly solved by the introduction of a top-load litter of some pattern as it is possible for that problem ever to be.

Finally, neither the side-load nor top-load litters suggested are to be regarded as final. They can both be greatly improved; but the improvements can only be made as a result of trial under service conditions.

THE BEST METHOD OF RECRUITING THE INDIAN ARMIES.

BY CAPTAIN G. P. RANKING, 24TH PANJAB INFANTRY.

"The best method of recruiting the Indian Armies from sources not hitherto tapped, on the assumption that enlistment amongst the recognised martial races of the Indian Empire and its frontiers has been pushed very nearly to its utmost limits."

MOTTO : "*Fortiter et Recte.*"

It is an unquestionable fact that the first line of our Native Army is now enlisted exclusively from the Panjab, the tribes beyond the North-West Frontier, and from Nepal ; and undoubtedly the more southern and eastern races of India have each in turn lost their martial instincts, as security to life and property due to British rule has rendered reliance on their own arms unnecessary. This is very clearly evident from a glance at the distinctions borne by native regiments in the Army List. The regiments that fought under Clive and Wellington are now no longer those on whom we depend ; their day is past, except for petty tribal expeditions, and the more northern and recently raised regiments have taken their places. Whether the races from which we now enlist the regiments of our first line will, in their turn, lose their fighting instincts remains to be seen. It is probable that those within our border will deteriorate, unless their hereditary instincts are kept up by fairly constant military service : this deterioration, however, is not yet apparent.

One cause of deterioration amongst the more southern races is possibly the secondary position that has been allotted to them since the mutiny. Pride of race is a large factor in war, and it cannot be expected that regiments that are either not sent on service at all, or, if sent, are relegated to the lines of communication, can have that belief in, and reliance on, themselves that is necessary to make them fit for the first line. Possibly, in the case of a sturdier race, this relegation would not have such a deteriorating effect ; but undoubtedly supineness is the most characteristic feature of the native of India, and his tendency to accept any position allotted to him is most marked. All our efforts to better and help him have only the effect of making him more dependent, more helpless and less self-reliant, and such being the

case, it is not strange that the races we relegate to our second line accept the position and adapt themselves to it.

Let us assume that enlistment has been carried as far as it will go amongst the classes we now enlist, and that these classes are practically exhausted. Where are we to turn for fresh recruiting grounds for India? The races that furnished us with recruits during the days of the East India Company have admittedly lost their fighting instincts, and we must therefore look further afield.

I think it will be admitted that the only races we can hope to enlist outside India are those over whom we have at least a protectorate or who adjoin our territory. It would be a long and a difficult task to review all the races in or surrounding India on whom we have not yet drawn for recruits. The few that occur to me will, I think, be sufficient for my purpose. They are, I think, fairly typical of all the races we have not yet tried in our ranks.

Burma is, for the most part, a new possession, but I believe we have only so far raised a company of Sappers and Miners from its inhabitants, and though this company has done well, it has not, so far as I know, been the cause of any suggestions for the further enlistment of Burmans for more general service. The company consists of Burmans, Shans, Kachins, and Karens. The Panthays might furnish us with some companies, but, if there were any probability of their proving worthy of enlistment, we should doubtless have taken them in hand long ere this. The Chins, Lushais, Nagas, and Manipuris give no better prospects, and it must be remembered that the point at which we should have to meet the greatest pressure in time of war would be the North-West Frontier, with its cold and severe winters. The exposure would be more deadly to the tribes I have mentioned than any enemy, even if we raised from them battalions admirably suited for work in their own climate and among their natural surroundings.

The Tibetans who fought against us in the Sikkim Expedition certainly offer better prospects: they are men of fine physique and inured to cold, but we have no guarantee of their possessing any of the requisite qualities for soldiers, and it remains to be seen if their enlistment would be practicable. I am afraid the men who could give an opinion as to the practicability of their enlistment are few in number, and those who would advocate their enlistment still fewer. The Bootias are a sturdy race in physique, but I have never

heard any of these qualities attributed to them that are necessary for soldiers. From Nepal it seems unlikely that we could draw any other class of recruits than we do at present. Kashmiris, though of fine physique, are proverbial for cowardice; and it would be strange if, after their years of servitude and oppression, they were otherwise.

With Tibet we have little connection, and prejudiced against us as the Tibetans are and contemptuous of all foreigners, the possibility of their furnishing us with recruits seems remote. The tribes adjoining the Black Mountain come next, and they furnish us with a few recruits.

Beyond Dir to the northward the people are a contemptible race.

The tribes I have mentioned above extend over such a large space of country that it is impracticable for any one man to have an intimate acquaintance with all: and to give an opinion that any one tribe is one that would repay enlistment necessitates a special acquaintance with it. On the other hand, it is very easy to see from a superficial acquaintance what tribes are obviously unfitted for our ranks, and I can say most emphatically that the majority of those I have mentioned above are quite unsuited for soldiers.

The consideration of the Pathan tribes within our political sphere of influence I propose to leave for the present: beyond it, for the most part, if one can judge from the past, our ally, the Amir, would put a summary stop to any organised attempt at enlistment.

The enlistment of Waziris, Baluchis, and the southern Pathans generally has not so far been successful. In the future probably an extension of this enlistment will be possible. At present these tribes show a marked aversion to enter our ranks, but as they come within our present recruiting grounds it will be more convenient to postpone their consideration for the present. Of Sindh I am unable to speak: so far as I know, no enlistment of Sindhis has been attempted since Sir Charles Napier's time.

The above classes practically complete the people lying outside our present and past recruiting grounds, but sufficiently within our sphere of influence for us to be able to enlist them. None of them, however, except the Waziris, Baluchis, and southern Pathans, offer us any hopes of material fit for soldiers.

Looking further afield at China and the Straits, we find the Sikh police overawing the populace merely by moral force,

and it seems too much to hope that people who are so readily held in check could take the place of the men to whom they yield such ready submission.

Africa seems more hopeful : there are many warlike races from the Sudanese in the north to the innumerable tribes in the centre and south of the Continent, and we may take those tribes that lie within the British sphere of influence in Africa as offering us possibilities for new recruits.

It is more than doubtful, however, whether the Sudanese could be spared from the Egyptian Army, of which they form the backbone. As regards the tribes in Central Africa, we have found that the Sikhs and Panjabi Muhamadans have always more than held their own against any tribes they have come in contact with, though outnumbered by ten to one.

The more southern tribes appear to be much more desirable in every way, and on many occasions we have found them gallant opponents ; but the fact remains that we are ignorant whether, under the altered conditions of life and the necessary restraints incumbent on service in a disciplined army, their warlike characteristics might not disappear. With closer contact with civilisation than their neighbours, the " Cape boys " have, I believe, lost all their warlike spirit. We have also no guarantee that such tribes would be able to stand the climate of India.

A savage has much more difficulty in adapting himself to a new climate and a new mode of life than a civilised man, and it seems much a matter of speculation whether men from such tribes as Zulus, Kafirs, Mashonas, Bechuanas, Matabeles, etc., would not lose their fighting capabilities and physique, if not their lives, after a short residence in India. The expense of importing and keeping up such alien troops would be heavy, and the difficulties of enlisting and training recruits would be great, and we do not even know that they would enlist.

Although I have talked of these South African races collectively, there are doubtless as many differences amongst them as there are amongst the races and classes of India, and some are undoubtedly more likely to offer us suitable material for recruits than others ; but to suggest with any authority which of the races would be most likely to prove satisfactory requires an intimate knowledge of both India and Africa that is, I fancy, possessed by few.

To my mind our prospects of finding races to replace our present first line of the Native Army outside our present recruiting grounds are poor indeed. Doubtless there are

tribes and races with whom we are more or less in contact who could furnish us with recruits and from whom much might be expected, but after all it could be only as an experiment that we could enlist them and their success as soldiers would be problematical.

Although, however, entirely new ground does not offer us any great prospects, I am still of opinion that there is much available material to our hand that at present we ignore.

Our first line now consists of Gurkhas, Sikhs, Panjabi Muhamadans, and Pathans, to which I may add Jāts, who are, after all, closely allied to the Jat Sikhs who form two-thirds of the Sikhs.

How far the extension of Gurkha recruiting is possible I do not feel in a position to speculate. Our enlistment of Gurkhas is, I understand, more or less dependent on the Nepalese Durbar, and we may take it for granted that it would be impracticable to increase the sixteen battalions we now have to any great extent.

I propose now taking each of the classes we enlist in the Panjab and beyond the North-West Frontier separately, with a view to seeing—assuming that we have reached their limits as we now enlist them—if any portion of them we now neglect would repay enlistment.

Sikhs.

The Sikh nation ended with our conquest of the Panjab : the "Singh" religion still flourishes.

The Sikh religion was originated at the commencement of the sixteenth century by the first Guru Baba Nanak, a Khatri. His religion was merely a protest against the tyranny of the priesthood : "He did not despise or attack the Hindu or

Ibbetson's "Census of the Panjab." "Muhamadan teachers : he held indeed that

"they too had been sent from God, but he "preached a higher and purer religion, embracing all that was "best in both * * * . He prescribed no caste rules or "ceremonial observances, and indeed condemned them as "unnecessary and even harmful, but he made no violent attack "on them : he insisted on no alteration in existing civil and "social institutions, but was content to leave the doctrine of "the equality of all men in the sight of God to work in the "minds of his followers. He respected the Hindu veneration "of the cow and the Muhamadan abhorrence of the hog, but "recommended as a higher rule than either total abstinence

"from flesh. In short he attacked nothing: he condemned
 "nobody * * * * . Nothing could have been more gentle
 "or less aggressive than his doctrine: nothing more unlike the
 "teaching of his great successor Govind."

In short Guru Nanak was merely a religious teacher, whose sole object was to teach men to live purer and better lives.

The object of his teaching was not to form a nation but a tolerant religion. The nation came later and was founded by Guru Govind Singh, the tenth Guru. Various changes had taken place among the Sikhs under the eight intervening Gurus, but it remained for the tenth Guru to weld the Sikhs into a fighting nation and to abolish caste among his adherents. Guru Govind Singh's "religious creed was in many respects the same
 "as (that of) Nanak: the God, the Guru, and the Granth
 "remained unchanged. But where Nanak had substituted holi-

Ibbetson's "Census of the Panjab." "ness of life for vain ceremonies, Govind
 "demanded brave deeds and zealous devo-
 "tion to the cause as the proof of faith * * * * . The
 "religious was entirely eclipsed by the military spirit, and
 "thus for the second time in history a religion became a
 "political power, and for the first time in India a nation arose,
 "embracing all races and all classes and grades of society, and
 "banded together in the face of a foreign foe."

The first disciples to follow Govind Singh were a Khatri, a Jat, a Chimba, a Nai, and a Kahar, and the very fact of representatives of these five classes joining him at the same time showed what a leveller of caste the new religion was. The ceremony of initiation was known as the *Pahul* or 'Gati,' and part of it consisted in eating certain food (*prashud*), which all four castes were bound to eat in common as a bond of union, and this is still the form of initiation. "He (Govind Singh) gave them outward signs of their faith in the unshorn hair, the short drawers, and the blue dress; he marked the military nature of their calling by the title of *Singh*, or 'lion,' by the wearing of steel and by the initiation by sprinkling of water with a two-edged dagger, and he gave them a feeling of personal superiority in their abstinence from the unclean tobacco * * * . He openly attacked all distinctions of caste, and taught the equality of all men who would join him. The higher castes murmured and many left him, for he taught that the Brahman's thread must be broken, but the lower orders rejoiced and flocked in numbers to his stand-ard." The Sikhs thus became divided into two portions—the original Sikhs, the followers of Nanak, and the 'Singhs,'

the followers of Govind Singh, who become 'Singhs' not by birth but by initiation.

My reasons for laying such stress on the difference between Singhism and Sikhism will be apparent later. The fighting nation of the Panjab are the Singhs, not the Sikhs, though the former are almost invariably known by the latter name, and it is the Singhs we enlist, and it is Singhism and not Sikhism that we should endeavour to uphold. But do we? The essence of true Singhism is the absolute equality of all its adherents. In the early days, after the conquest of the Panjab, a man was enlisted purely as a Sikh (*i.e.*, Singh), and many of them came over to us from the old army of the Khalsa as Sikhs only. It mattered not whether a man was a Jat or a Labana, a barber or a Brahmin, he was a Singh, a sworn follower of a fighting creed, and as such he entered both Ranjit Singh's and, later, our ranks, and fought gallantly as his forefathers had fought for a century and a half before. Later the enlistment of Brahmins was forbidden, and then as years went by our field of enlistment began to narrow itself and regiments only recruited from Jat Sikhs. Then the recognition of the subdivisions of the Jats took place, and regiments endeavoured to confine themselves to some few of the numerous "*gôts*," or clans. Some are at present more favoured than others, and shortly the less favoured ones will practically disappear from our ranks. Now, by this method of particular enlistment, we doubtless obtain the very cream of the Sikhs, but at what cost? In the first place we deal a blow at the very first principles of Singhism—the very religion we should most foster for the sake of our native regiments—by ignoring the equality of its adherents. In the second by closing our ranks to all, save Jats, we assist the remaining castes to lose their martial spirit. It is a matter of common knowledge how our old fighting races outside the Panjab have lost those instincts which fitted them for our ranks, and it is generally accepted that this deterioration is due mainly to living peaceful and secure lives. Service in our ranks is the only remedy we can offer for this decadence. How can we expect the Sikh nation to retain its fighting qualities, as a whole, when we confine our enlistment to a particular fraction?

At the last census the Jat Sikhs mustered some 1,100,000 souls: the remaining Sikhs about half that number, and it is to these Jat Sikhs that our enlistment is now practically confined.

It must also be remembered that the majority of men who return themselves as Sikhs are Singhs: that many Jats do not

become Singhs, even with the incentive of military service before them, and that a much smaller proportion of the other castes became Singhs, as their relations are gradually dying out in the Native Army, and they have no incentive to take the *Pahul*. Were we to again commence enlisting other classes than Jats, the immediate result would be to increase these classes, for many more individuals belonging to them would at once take the *Pahul*. I am no advocate of indiscriminate enlistment, but I have no hesitation in saying that in every Sikh enlisting regiment there are still many Labanas, Tarkhans, Khattris, and men of many other castes serving as native officers and non-commissioned officers, and who have served the State excellently, and that further enlistment of them would repay us.

One Khatri I know is, at the present moment, Subadar-Major of one of our best known regiments. It may be objected that, *cæteris paribus*, the low caste Sikh—if I may use the term when Sikh and caste should be contradictory terms—cannot be such a good man as the higher caste Jat; but with regard to this point I would instance the Mazbi Pioneer Regiments. No regiment has a better record of services than the Pioneers from the time they were raised to the present day. The position of Mazbis, too, in their native villages has been altogether against their developing the martial traits we expect from Sikhs. Only admitted as outsiders to the community they have never been fully recognised as Sikhs, and their position is all the more difficult, for they are scattered over all the Sikh country—a hut or two to each village—and are naturally looked down on by their fellow villagers. Now a colony of Mazbis has been formed near Madhopore, and the result should be to raise the self-esteem of its inhabitants and make them better fighting men.

Although Govind Singh's teaching required all men taking the *Pahul* to consider all other Singhs as social equals,* caste prejudices were too deep rooted for this equality to remain long a reality, and social differences have gradually re-asserted themselves. Our action in confining our enlistment practically to Jat Sikhs accentuates these class distinctions, which, if it is our interest to foster true Singhism, we should endeavour to ignore.

Excluding Mazbis, there are 132 Sikh companies in the Native Army. (I do not propose to include the cavalry in my

* Outcastes were never admitted to the faith, except in the case of the Mazbis.

calculations.) I have not got a caste return to refer to, but I think I am correct in saying that probably 130 of these companies are composed of Jat Sikhs. Amongst them there are, of course, many individuals who are not Jats, but as companies they are Jat Sikh companies.

I take from Captain Crowther's notes on Sikhs the numbers of the different Sikh castes at the last census :—

Sikh castes.	Numbers at census of 1891.
Jat	1,122,011
Brahman	7,680
Khatri	52,894
Rajput	20,079
Mahton	17,536
Sain	17,991
Kamboh	37,074
Kalal	9,392
Arora	60,161
Labana	18,178
Tarkhan	134,883
Nai	20,245
Chimba	23,456
Lohar	24,427
Kahar	22,146
Julaha	3,121
Chamar	107,468
Chura	94,874
Total Sikhs	1,793,616

Of the above castes, the Khatri, the Kamboh, the Kalal, the Labana, and the Tarkhan are recommended by both Captain Crowther and Captain Falcon as being good men to enlist. Together they amount to over a quarter of a million.

A larger proportion of these castes than of Jats are necessarily from their occupations dwellers in cities, and consequently undesirable as recruits; but, on the other hand, not having the incentive of military service before them, many of them do not take the *Pahul*, and are consequently not returned as Sikhs. Opening our ranks to these castes would at once have the result of increasing the numbers of those who take the *Pahul*, and the increase in the villages should fairly balance the numbers who, dwelling in the cities, are unsuitable for enlistment.

The popularity of Singhism is much influenced by outside circumstances. After the conquest of the Panjab, Singhism lost many of its adherents. Many relapsed to the old Sikhism, and new followers only came forward in very small numbers. This defection was due to two causes: partly to the failure of the Khalsa in arms, and partly to an idea which became prevalent that the British Government was opposed to Singhism. When it was found that the latter reason was erroneous, and that the Government was well disposed towards and looked with a favourable eye on the Singh religion, its adherents at once began to increase in numbers. Similarly, I think that if we recognise the Khattris, Kambohs, Kalals, Labanas, and Tarkhans as being fit for our ranks, we shall increase their status and consequently their number of adherents. To the castes mentioned above I should be inclined to add the Rajputs and possibly the Kahars. All the Rajput Sikhs I have known have been good men, and although the status of the Rajputs is a peculiar one—as they lost social position when they became Sikhs—still their position among Sikhs is good, and they should not be wanting in fighting qualities, as they come of a fighting stock second to none in India. The Dogra Rajputs and the Muhamadan Rajputs are both much sought after as soldiers.

In any case the classes both Captain Crowther and Captain Falcon recommend should be capable of furnishing us with some 24 or 25 companies more than we have at present—a very substantial addition in men and indirectly most desirable as an incentive to Singhism.

Jats.

The line of demarcation between the Jat Sikhs and the Jats is a hard one to define. Near the great Sikh centres where the majority of the Sikhs are Singhs the difference is undoubtedly more marked, but further east the *Mona* Sikh and

the Hindu Jat can hardly be separated, and they intermarry freely. The term Jat has now come to signify cultivator from the pursuits of the members of the race, but the term is strictly a racial one, and implies a member of the Jat tribe whether Hindu, Muhamadan or Sikh. At the census of 1881, the numbers of the different religions were—

Hindu Jats	1,498,694
Muhamadan Jats	1,807,080
Sikh Jats	1,126,861

The Hindu Jats we enlist come mainly from the Jamna Districts of Jhind, Rohtak, and Hissar, where they call themselves Ját—not Jat. Consequently the Hindu Jats are commonly known in the Native Army as Játs. I am unaware which is the correct name and which the corruption, but it will be more convenient to refer to the whole of the Hindu Jats as Játs.

The Játs furnish us with 42 companies—16 of which belong to the Bengal Army and 26 to Bombay—and this, with a population exceeding that of the Jat Sikhs by 370,000. If I am right in supposing that we have 130 Jat Sikh companies, the Játs should, in the same proportion, be capable of providing us with 170 companies. The Játs, however, differ much from the Jat Sikhs in two respects: in the first place, they are much more widely scattered over the Panjab, and their characteristics vary to a considerable extent with the locality in which they live; in the second place, they are not bound together in the brotherhood of arms by their faith as are the Sikhs. It would be idle, therefore, to suppose that we could obtain the same proportion of soldiers from them of the same level quality as we obtain from the Sikhs, but I think that, without difficulty, we could double the number of our Ját companies, and not only keep up the quality of our recruits, but perhaps improve it. The deterioration of our fighting races undoubtedly spreads from the south and east, and for this reason the more northern and western Játs should offer us better material than those from the south-east of the province.

There is no question about the physique of the Ját; it is undoubtedly fine. As regards his character, Mr. Ibbetson says, speaking of the province generally: "His manners do not bear that impress of generations of wild freedom which marks the races of our frontier mountains. But he is more honest, more industrious, more sturdy, and no less manly than they. Sturdy independence, indeed, and patient, vigorous labour are his strongest characteristics."

The 14th Bengal Lancers are entirely composed of Jâts, and during the Afghan War they established the reputation of the Jâts as soldiers.

Although enlistment of the Jâts to the same extent as the Jat Sikhs would not be desirable, I still think that we could, with great advantage, greatly increase the number of our Jat companies, and were we to draw this increase from further west than we do at present, we should do much to keep alive the martial spirit of a large portion of the Jât tribe, who have now no opportunity of entering our ranks. The western Jâts are at present practically non-existent in the Native Army, and they form a recruiting field well worth exploiting.

Dogras.

The term 'Dogra' is an inconvenient one to use, as it is merely a geographical one, meaning the people who dwell in a certain tract of country. The Dogra country now includes all the hilly country lying between the Chenab and the Sutlej, though originally its limits were confined. The term 'Dogra' strictly includes all dwellers in this country, whether Muhammadan or Hindu, high caste or low caste, but from a military point of view, it is only used for those classes in that tract that are commonly enlisted. These classes are Brahmins, Rajputs, Rathis, Thakurs, and Girths.

As regards the Brahmins little need be said. The Brahmins of the hills are divided into two classes—the priestly and the agricultural. The latter class are enlisted to a certain extent, and there does not appear to be the same objection to enlisting hill Brahmins of the agricultural class that there is to the enlistment of the Brahmin of the plains and the Brahmin of the hills, who belongs to the priestly class. In any case any increase of the Brahmin element in our ranks seems undesirable.

The Thakurs, Rathis, and Girths are confined to the hills, and it may be taken that their enlistment cannot be much extended.

The Rajputs, on the other hand, are a race much more widely scattered. The greater number are found in the following districts :—

Census of 1881.

Hoshiarpore	52,644
Kangra	90,638
Gurdaspore	33,723

the total number of Hindu Rajputs in the province being 364,860.

Practically the whole of our cis-frontier Dogra recruits are enlisted from the three districts I have mentioned above (many, of course, come from Jammu and are not included in these figures), but I think I am right in saying that enlistment, even in these districts, is practically confined to the hill tracts. There are, therefore, a large number of Rajputs, both in the plains portion of the above-mentioned districts and in the remainder of the province, who are never now enlisted; and it appears to me that these Rajputs might, with advantage, be included in our ranks. Mr. Ibbetson says of the Rajputs: "The Rajputs of the Panjab are fine brave men, and retain the feudal instinct more strongly developed than perhaps any other non-menial class, the tribal heads wielding extraordinary authority. They are very tenacious of the integrity of their commercial property in the village lands, seldom admitting strangers to share it with them. Pride of blood is their strongest characteristic, for pride of blood is the very essence of their Rajputhood. They are lazy and poor husbandmen and much prefer pastoral to agricultural pursuits, looking upon all manual labour as derogatory and upon the actual operation of ploughing as degrading, and it is only the poorest class of Rajput who will himself follow the plough. They are in most parts of the Panjab plains cattle stealers by ancestral profession, but they exercise their calling in a gentlemanly way, and there is certainly honour among Rajput thieves."

Morality is after all much a matter of convention, and if cattle-stealing is not looked on by the Rajputs as a disgraceful offence, there is no reason why we should judge it too harshly, except as undesirable for the welfare of society. Murder is a crime of daily occurrence amongst our trans-frontier tribes, yet we never enquire from a Pathan recruit whether he has shot a man; in fact, in many instances, recruits come up for enlistment merely to escape the consequences of having done so. They make none the worse soldiers for that, and I do not think being addicted to cattle-stealing at his home would interfere with a Rajput's efficiency as a soldier: at any rate, he would have no opportunities of indulging his proclivities when with a regiment.

Many of the Rajputs became Muhamadans, and these are much sought after as soldiers, both by the cavalry and the infantry. The Hindus, however, are entirely neglected (except in the hill tracts), though they seem to be very promising material for soldiers. I have never come across any in our

ranks, so I can only suggest their enlistment as an experiment, but it seems to me to be an experiment that would be well worth trying.

Certainly the qualities we always attribute to the Rajputs are just those that should make him an excellent soldier. The Rajputs of Rajputana are much enlisted in the Bengal Army, and it seems a pity to ignore the Rajput of the Panjab, who should, presumably, be a better man.

Panjabi Muhamadans.

At the census of the Panjab in 1881, the Muhamadan population, exclusive of Pathans, amounted to 10,803,040. Of course this number includes all classes and occupations and dwellers in cities as well as villagers, but from the same census report it appears that 57 per cent. of the Muhamadan population, or roughly 6,100,000, are engaged in agricultural and pastoral pursuits, and it is of course from the agricultural and pastoral classes that we draw our recruits. This agricultural Muhamadan population varies very much. When the Muhamadan conquerors swept over Northern India, they made many converts in a rough and ready fashion. Some of these were willing converts; others unwilling, but all were made Muhamadans without regard to class or caste. Consequently, amongst the Muhamadans we find branches sprung from every Hindu race and caste. Some come from a fighting stock, others from the menial classes, and of course a very large proportion are quite unfitted for soldiers.

Taking it for granted that the whole agricultural Muhamadan population were of the same quality, they should be capable of furnishing us with, in the same proportion as the Jat Sikhs find us recruits, some 700 companies, and though this estimate would have to be enormously reduced in practice, they can undoubtedly furnish us with very many more companies than the $77\frac{1}{2}$ they now provide.

Panjabi Muhamadans are for some reason not now in much favour, and of late years have in many regiments been replaced by Pathans, either cis or trans-frontier. Every class company regiment in the Panjab and many in Bombay and Burma, however, have still got companies of them.

The tendency among regiments is now to confine their enlistment of Panjabi Muhamadans to the more northern sections. Formerly most regiments enlisted no men from south of the Ravi; more latterly some regiments have begun to draw their line of enlistment at the Jhelum.

How far the Muhamadan is losing his fighting spirit it is difficult to say, but I have never come across any one who could give me any reason for drawing our southern line of enlistment so far north. We enlist Sikhs from very much further south. In the ordinary course of events deterioration will probably set in from the south, but are we not expediting its progress by excluding the southern sections from our ranks?

I have never heard of Panjabi Muhamadans doing otherwise than well on service, and I am unable to see why we should eliminate from our regiments sections we have not yet found unsatisfactory.

A reference to Captain Hamilton's "Notes on Panjabi Muhamadans" shows that the main tribes that are now enlisted are the Awans, Ghakkars, and Tanaolis, and the various Jat and Rajput clans, of which the best known are the Bhattis, Chibs, Janjuas, Sattis, and Tiwanas.

From the census report of 1881 I take the numbers of the Muhamadans of each of these tribes in the province —

Muhamadan Jats	1,807,080
„ Rajputs	1,294,694
„ Awans	532,894
„ Ghakkars	25,788
„ Tanaolis	41,388

As men from the districts of Delhi, Gurgaon, Karnal, Rohtak, and Hissar are enlisted as Hindustani Muhamadans, it is necessary to make a considerable deduction from the totals available for enlistment; but when it is remembered that the whole Sikh population of the Panjab only amounted in 1881 to 1,716,114, it is obvious that our Panjabi Muhamadan companies could be enormously increased.

The tendency now is for regiments to restrict their recruiting to some particular clan or clans, and this tendency is increasing yearly with the result that many tribes we used to enlist now furnish us with but few recruits. This special tribal enlistment, of course, still further contracts our field for recruiting, which is in addition steadily narrowing in its local limits.

If we continue only enlisting the classes we do at present, and still more, if we continue narrowing our circles of enlistment, we shall undoubtedly reduce the remainder of the Muhamadan population to peaceful cultivators much too peaceful for our ranks. I am of opinion that there is ample material at present to double or treble our Panjabi Muhamadan companies without detriment to their quality, but this material will in a few years, if we neglect it, become useless.

Pathans.

As regards Pathans, I am fortunate in having access to a return, compiled in 1893 or 1894, which gives the tribal composition of each Pathan enlisting regiment. The return shows 70½ companies which, with one company in the 2nd Burma Battalion, one in the 3rd Burma Battalion, and four in the 28th Bombay Pioneers, since raised, brings the number up to 76½ companies, our present strength.

The number of men in our Pathan companies at that time was 7,439. They came from the following districts:—

Trans-Frontier	3,879
Peshawar District	1,570
Kohat District	994
Bannu „	348
Dera Ismail Khan District	4
Cis-Indus	310
Doubtful location	12

The total being completed by 248 men belonging to Baluch and other tribes in the south, and 74 men belonging to non-Pathan tribes.

The trans-frontier and cis-frontier Pathans are thus nearly equally represented in our ranks. In the case of the trans-frontier tribes I take the numbers of each in our ranks, and a comparison of these numbers with the fighting strength of each tribe as given in Paget and Mason's "Expeditions against the tribes on the North-West Frontier" will, I think, be of interest.

Tribe.	Estimated number of fighting men.	Number in our ranks.
Afridis	26,500	1,907
Bunerwals	8,000	283
Gaduns	2,500	71
Khudu Khels	1,800	14
Swatis	9,000	156
Utman Khel	5,000	16
Mohmands	20,300	110
Orakzais	24,880	309
Waziris	41,530	51
Shinwaris	10,000* or 12,000	151
Bajauris	10,000* to 15,000	188
Ghilzais	?	232
Duranis	?	181
Hazaras	?	136
Other trans-frontier tribes . . . . .	...	74
TOTAL . . . . .	...	3,879

* From Mr. Oliver's "Pathan and Baluch."

The first point noticeable about this return is the enormous disproportion of Afridis in our ranks to men of other tribes and to the fighting strength of their tribe, and when it is remembered that of the other trans-frontier tribes, the 40th Pathans—a newly raised regiment debarred from enlisting Afridis—absorb 835, the disproportion becomes greater. The Afridis have the reputation of being the pick of our trans-frontier tribes. How this reputation was gained is not very apparent now. I believe in the earlier days of the Panjab Frontier Force they were, for political reasons, the only trans-frontier Pathans who were allowed to be enlisted: they thus became known, and they have succeeded in keeping their place in our ranks. In many regiments trans-frontier recruiting is compulsorily confined to Afridis, which, of course, to a great extent accounts for the large number in our ranks.

The Afridis are of much the same strength as the Orakzais, their next-door neighbours, and frontier officials say there is very little to choose between them as material for soldiers, and, as a matter of fact, the Orakzais have always held their own against the Afridis. The Afridis are undoubtedly the finer race taken as a whole, but the tribe is so depleted by the demands that are made on it that much finer recruits are easily obtainable from the Orakzais.

A comparative survey of the fighting qualities of all the different tribes mentioned in the above table would take up too much space, if indeed it were not out of place in this article. Some tribes are considered to offer us better material for recruits than others, and the fighting and other qualities of the different tribes doubtless vary; but all Pathan tribes are, in the main, much alike, and these differences are slight and not such as to make any appreciable difference in the characters of individual members of the tribe.

As matters stand, I do not think I am making a very bold statement when I say that, except the Afridis and perhaps the Orakzais, no other tribes had a fair trial in our ranks until the 40th Pathans were raised. Of course trials of one or other of the tribes have been made in different regiments from time to time, but so far as I know, these trials have only consisted of a few men at a time. A few men, however, living in a company of, perhaps, their hereditary enemies, seldom have a fair chance. The native officer of the company, naturally desirous of having men of his own tribe under him, is not likely to extol the outsiders, if indeed he does not make them scapegoats for the misdeeds of the

remainder of the company. Consequently the new men are not found satisfactory and are allowed to die out, if indeed they do not settle matters themselves by taking their discharge as soon as their service qualifies them for it. We cannot, I think, say we have given the other tribes a fair trial until we have enlisted them in entire companies with their own native officers. This has been done in the 40th Pathans, and the result will, I think, be to bring many of the tribes we now neglect into favour.

Of course these tribes, living in a constant state of inter-racial war, are not likely to lose their fighting instincts so long as they are beyond our frontier ; but it is always difficult, in the first instance, to form a connection with them, and to get them to enlist freely would be a matter of years. They know no one in our ranks and are entirely ignorant of the benefits service in the Native Army has to offer.

The attempt to enlist one or two tribes has resulted in marked failure—notably in the case of the Baluchis and Waziris. Their dislike to discipline and the wearing of uniform has been the main difficulty. Doubtless in time this will be overcome, and the enlistment of these tribes in the local levies and military police will doubtless be the thin end of the wedge which will eventually open to us large and good recruiting grounds.

The tribes, I submit, among whom we should endeavour to push our recruiting are the following:—The trans-frontier Yusufzai tribes, including Bunerwals and Swatis, Bajauris, Utman Khel Mohmands, Shinwaris, Orakzais, Waziris, Baluchis, and the mass of Pathan tribes south and west of the Waziris. All of these tribes contain good material for soldiers which, if we got fairly in touch with them, should be freely forthcoming.

Of the tribes further west under the influence of the Amir, it is harder to speak. It may, however, be taken for granted that any attempts on our part to enlist them would not be well received by His Highness. Possibly he might not raise much objection to our enlisting the Hazaras of the Hazarajat. They are *Shiahs*, and on that account he is almost constantly at war with them. The Hazaras are generally to be seen in the cold weather in the trans-Indus tracts working in large bodies as coolies. They are said to be brave and are certainly of very fine physique, though not tall. At work, such as road-making, requiring strength and continued labour, they are unrivalled. Quiet and well behaved, they should make an ideal

Pioneer Regiment. A few of them have enlisted, and the tribe should be well able to supply us with a regiment. They would probably be more inclined to enlist in a regiment by themselves than in one in which they were outnumbered by *Sunis*.

The demand for Afridis is so great that the tribe as a whole could barely supply us with recruits of sufficient physique if we recruited from each '*Khel*' in proportion to its strength. But, as in the case of other classes, we have narrowed our circles of enlistment, and the demand is now only for Malik Din and Kambar Khels to the practical exclusion of the remainder, with the result that the recruits forthcoming are wretchedly poor. How far this exclusive enlistment is justified by circumstances is a matter of opinion: to my mind it is more a matter of fashion than anything else.

As regards cis-frontier enlistment matters are different. The peaceful state of affairs that followed our occupation of the trans-Indus tracts has, of course, rendered it unnecessary for every man to protect his own life and his own property with his own hands, and our cis-frontier Pathans are no longer cradled among scenes of inter-tribal warfare and inter-family blood feuds. The former state of affairs, however, ceased only a generation or two ago, and the pure bred Pathans have still the fighting instincts left in them. I am unaware of any reason why any one clan should have lost these instincts more than another, provided it was a clan that held its own as the dominant section within its own limits. Of course tribes that were reduced to, and kept in, a state of dependency by their more powerful neighbours are unlikely to possess these traits. Tribes also that live in unhealthy tracts are unlikely to be of sufficient physique, and the dwellers near large cities are, for other reasons, undesirable as soldiers.

But the majority of tribes have held their own in their own districts or '*tappas*,' and a comparison of the numbers of each Pathan tribe in the Peshawar Valley with the numbers in our ranks will show, I think, that our enlistment can hardly be called general, and that it might, with great ease, be much extended.

I take the following figures from the Gazetteer of the Peshawar District. I only take such tribes as are the dominant ones in their own section or '*tappa*.' Many other tribes are shown in the Gazetteer, small colonies of which live in the valley and city, and who are enlisted by us from their own homes elsewhere. Probably none of these are enlisted by us

from their representatives in the valley, and to include them would be both incorrect and misleading :—

Tribe.	Number in the Peshawar Valley.	Number in our ranks.	REMARKS.
Yusufzais	70,045	1,235	Of the Peshawar Valley only.
Khattaks	36,444	177	
Muhamadzais	18,035	None.	Does not include the trans-frontier Utman Khel.
Utman Khel	6,768	20	
Daudzais	4,949	4	The cis-frontier section only.
Khalils	13,268	48	
Mohmands	40,080	86	
Gigianis	4,756	None.	

Of these the Daudzais and Gigianis live in a low and unhealthy country, and are consequently of poor physique; the latter also were much oppressed by the Durani sardars, and this oppression has left its mark on their character.

It will be seen that, while the Yusufzais are much enlisted, all the other tribes are greatly, if not entirely, neglected. I think this may be partly accounted for by a belief, which is more prevalent than appears credible, and that is, that the Yusufzais are the only Pathans of the Peshawar Valley. In this connection I might mention that, though no Muhammadzais (a finer race than the Yusufzais) are shown in our ranks, I am acquainted with several who have served for years. They were probably returned as Yusufzais.

It is unnecessary here to continue the review of our Pathan enlistment, district by district, but the following figures show how largely our enlistment is confined to one or two special races. The Peshawar, Kohat, Bannu, and Dera Ismail Khan Districts provided us, at the time of this return, with 2,916 recruits, who were furnished by the following tribes :—

Yusufzais	1,235
Khattaks	1,250
Bangash	235
Marwats and Gandapuris	33
Mohmands (cis-frontier)	86
Khalils	48
Others	29
Total	<u>2,916</u>

In addition there were at that time in the Native Infantry 310 Khattaks from the Sagri country in the Rawal Pindi District.

It is thus apparent that the only two cis-frontier tribes in favour are the Khattaks and the Yusufzais, and the tendency now is towards the more southern Khattaks to the neglect of the Yusufzais and the northern Khattaks, and I think a caste return of to-day would show a considerably larger proportion of southern Khattaks and a similarly smaller proportion of Yusufzais and northern Khattaks.

I believe the six companies recently raised for Bombay and Burma have absorbed a considerable number of the tribes in the Peshawar Valley we have hitherto neglected, and as a move towards more general enlistment this is undoubtedly satisfactory.

With many regiments confining themselves to one or two special tribes or sections, the result is of course fierce competition for recruits, and a consequent falling off of the stamp of recruits available.

I am quite unable to account for any one tribe being more sought after than others, unless the following may give a solution. Some regiment has as a native officer a man who has great influence among his tribe, and is consequently not only able to bring good recruits, but to keep them in good order. The Pathans in this regiment become known by other regiments, are accepted as being the best, and a run on their tribe consequently follows regardless of the fact that with a good connection equally good recruits are forthcoming from almost every tribe. This solution is not quite so imaginary as it may appear.

I think the figures I have quoted above will show that our Pathan recruiting grounds could, without difficulty, be much extended.

My endeavour has been to show how our enlistment has year by year become more restricted, and how many of our fighting races have been eliminated from our ranks. The only remedy I can see for this state of things is a scheme of allotment of the different races and classes that may be considered suitable for enlistment, to different regiments, in proportion to their strength.

This allotment, while necessarily confining regiments to certain tribes, classes, or districts, would prevent their recruiting

grounds being encroached on by other regiments; they would thus be able to obtain the pick of the recruits of the tribes allotted to them, while the elimination of the less favoured classes or sections from our ranks would cease.

That such elimination must end in these races losing their fighting powers is, I think, too obvious to need any demonstration. Every year of neglect will make it harder to revive this fighting spirit and in a few years, unless steps are taken to foster it, it will be extinct.

That there is ample material in the Panjab to maintain twice or three times the number of regiments now on our strength I am firmly convinced. Doubtless, by our present system of enlistment we obtain the cream of the fighting races; but as our enlistment becomes more and more constricted year by year, it is not only easy to assume but to foresee that in a few years the gradually narrowing circle of tribes and classes to which we confine ourselves will be insufficient for our wants, while the fighting qualities of the tribes we formerly enlisted will have died out. In that event we shall undoubtedly have to seek outside the limits of the Indian Empire for foreign races to supplement, if not take the place of, our present first line. The enlistment of such foreign races would, however, necessarily for a long time be purely experimental. We know that the Zulus and the Sudanese are men of grand physique and gallant fighting men. We do not know that they would retain their fighting qualities under different circumstances, or that they would not deteriorate under the enforced drill and discipline of an Indian Cantonment.

We do not even know that the changed climate would not affect their physique, or that they would even live. It would be an easy task for any one with special knowledge of any foreign tribe to laud its fighting qualities and to hymn its praises as a substitute for our present Sikhs, Gurkhas, and Pathans, but such recommendations can only be of the nature of belief, not of knowledge—enunciations of opinion, not of fact.

Apart from such considerations altogether is the question of expense. What would be the cost of the up-keep of a regiment enlisted from beyond the sea? I do not think it would be too large an estimate to calculate it at double the cost of one of our existing regiments. Could our Indian revenues stand the expense of any army of this nature? We hear every day of the necessity for curtailing military expenditure. Doubtless, if India required such regiments, the money

would be found, but at what cost of taxation or curtailment of expenditure on canals, roads, railways, and everything, indeed, necessary for the prosperity of the country?

The day may come when such foreign troops will be necessary; but that day, if indeed it will ever come, is, I think, far distant, and by that time exploration and contact with new races will have brought new material to our notice, while the African tribes, who at present offer us the best hopes of recruits, will have probably followed the usual course of savages and lost their martial instincts by living peaceful lives under the, to them, deteriorating influences of civilisation.

Our present system of narrowing our circles of enlistment year by year will do more to hasten the advent of that day than anything else.

In conclusion, I would suggest the careful extension of our recruiting in the following directions:—

- (1) The enlistment of other Sikhs than Jat Sikhs.
- (2) The enlistment of the more western Hindu Jats.
- (3) The enlistment of the Hindu Rajputs of the plains.
- (4) The extension of our enlistment of Panjabi Muhama-dans.
- (5) The enlistment of other Pathans than Yusufzais, Khattaks, and Afridis.

When we have exhausted these, or have found that their fighting instincts are dead, it will be then time for us to look beyond the limits of the Indian Empire: by that time, however, civilisation and political changes will have so altered the alien tribes we might now expect to furnish us with recruits that speculation at the present day as to the races, to whom we should then have to turn, would be, to say the least of it, idle.

Writing on detachment from a small frontier post, I have been somewhat hampered by want of data to support my arguments. It is possible that I may have somewhat over-estimated the Jat Sikh element in our ranks, and that there may have been other recent changes in the composition of the Native Army of which I am unaware, but I do not think these changes will be found to materially alter my figures or my conclusions.

SOME NOTES ON A FRENCH CAVALRY REGIMENT OF CHASSEURS.

BY CAPTAIN V. B. FANE, 1ST PANJAB CAVALRY.

Last December, being in Paris, I was fortunate enough to obtain an introduction to a French General of Cavalry, who was good enough to allow me to be shown all round a French Cavalry Regiment of Chasseurs. Being much struck with all I saw, on my return to Paris I jotted down everything which I thought might be of interest to brother officers in India. I therefore venture to send them to the United Service Institution for publication in the Magazine. They are only rough notes, and if of interest to anyone, I shall feel that the trouble of making them has been amply repaid to me. They are under the different headings of—

- | | |
|---------------|----------------------------------|
| (1) Officers. | (7) Rations. |
| (2) Men. | (8) Riding and Schools. |
| (3) Barracks. | (9) Horses. |
| (4) Stables. | (10) "Voltige." |
| (5) Saddlery. | (11) Carbines and Swords. |
| (6) Canteen. | (12) Training of men and horses. |

I may commence by saying that I wrote to the General and thanked him for giving me leave to come, and said I intended arriving on a certain day. At the station, on arrival, I found the General himself awaiting me, accompanied by the Colonel of the regiment. The General apologised for not being able to ask me to breakfast, as he had just received a telegram to go to Paris, but that, if I would walk up to the barracks, I should find all arrangements made for taking me round. Accordingly, at the barracks, I found the "Commandant" (2nd-in-command) awaiting me, with two or three other officers. They had full instructions to show me anything I might ask to see. The following are the notes I made under the different headings:—

The officers were all exceedingly smart looking. Very well turned out, well cut riding breeches, and perfect figures of horsemen. Those I saw riding all had very good seats. Boots well made and fitting. The men seemed a very sturdy looking lot. The annual batches of recruits had just come in. They came mostly from Normandy and Bretagne.

(1) Officers.

(2) Men.

Several squads were at foot drill, and not having been long at it, did not look their best. The officers said they were all recruits, but I particularly noticed during my stay in France, principally in Paris, how poor an appearance a French Cavalry soldier presents on foot. The monstrous looking overalls they wear, and the almost invariable custom of walking about with their hands in their pockets, probably have a lot to do with their, to English eyes, unsoldierly looking appearance. The contrast between the smartness of the officers and the slovenliness of the men is very marked. The line soldiers, pion pion, looked much smarter.

The barracks were excellent, large, and well ventilated. The latrines were not good, and were insanitarily placed near the cook-houses. The washing-places were very small for the numbers of men using them. Water, however, was plentiful, and there were fifteen taps for each squadron. The barrack-rooms were very tidy, clean, and orderly. The carbines were placed in racks along the walls. Bedding was kept down all day; not rolled up as in our service. The men have their meals in a separate room, which is most excellent from a sanitary point of view: besides the room is available as a place to sit in, and as a lecture-room. They called it "salle d'instruction." The "sous officiers" have a small room to themselves, two to one room, very like our sergeants' rooms in barracks in India. All the barrack-rooms that I saw were particularly well kept, clean, and tidy. The "Commandant" apologised before going into the first one, saying "I fear you won't find them prepared for a visit." I replied "If only every barrack-room one visited unawares was as clean and tidy, what a nice state of affairs it would be." The stables are immediately below the barrack-rooms on the ground floor. Each squadron has, in addition to a separate eating-room, a squadron office, where the whole of the office work of the squadron is carried on. There is no regimental orderly-room. Squadron store-rooms take the place of our regimental quartermaster's stores. In each squadron store-room is every single article of clothing and equipment ready for issue as fast as men take them away on mobilisation, or when recruits come in. The officers told me that a recruit who joined in the morning could go on parade two hours after fully equipped and clothed. This store is entirely under the chef d'escadron. He buys everything according to sealed pattern, and replaces anything required. For this purpose he receives an allowance of thirty centimes, threepence, per man present per day. The

whole of his squadron clothing and equipment is under him. Very nice system too, but I fancy it would require very careful looking after!

Stables large and well ventilated. Horses bedded down all day. The grooming not up to the standard expected of a British Cavalry regiment.

(4) Stables.

The horses all had long coats, and in consequence looked the worse for them. The bedding did not look up to much, and its state could not be good for the horses' feet. Six men per squadron were on stable guard. The horses were separated by "bails," an excellent arrangement should a horse get its leg over.

Each horse had a large name board and card, giving year of birth, price paid, where bred, bought, regimental number, rider, etc.

Saddles were placed behind each horse on trees fixed to the walls. They were not good, and the French officers themselves complained about their

(5) Saddles.

age and the impossibility of cleaning them. I saw three different patterns in this smart regiment, mostly English made, and some of them actually bought during the war in 1870!!!

They looked much too narrow to sit on comfortably in marching order.

The horses' tails were cut shorter than with us, and were somewhat ragged. The day of the visit was a pouring wet day, which may have made the bedding, and the state of the saddlery, look worse than usual! Horses seemed very quiet in the stable.

Squadron canteens. Very small, but very comfortable, clean, and tidy. The cercle des sous

(6) Canteens.

officers (sergeants' mess) was particularly comfortable looking.

I saw these being cut up. French soldiers certainly get an excellent ration. Meat seemed first

(7) Rations.

class, and the bread as good when tasted as any to be got in any private house in Paris. I was shown the weekly menu, and was quite surprised at the excellent fare provided. On saying so; I was told how very much rations had improved of late years. The fare provided seemed to me quite as good as, if not better than, what our men get.

The cooking arrangements in the kitchens, too, were excellent. The fires were supplied and fed from a small room at the back of the kitchens, so that in the latter no coal, coke, wood, or anything could contaminate or dirty the rations.

I saw several rides. Some of the riders had only a few days' service, and it speaks volumes

(8) Riding.

for the training of the horses that these men rode so well. An officer was superintending each ride. This goes on all day, but there are nine officers per squadron. In Paris I saw a lot of cavalymen, and I was particularly struck with the way they sat their horses. I must have seen some hundreds of officers riding about in Paris. With few exceptions, they certainly knew how to sit on a horse. The riding-school was a very large building, big enough for a large musical ride. I noticed no "marks" anywhere. The rides were mostly trotting or walking. Not much attention was paid to regular pace or distances. All the men wear Wellington boots, with straight box-spurs. All were riding on the bridoon, and some pulled their horses' heads about a bit.

Horses, or rather remounts, all arrive on a regular fixed date yearly. They come at between four

(9) Horses.

and five years old. The first year they are kept at light work for short periods of time. The second year, having got thoroughly accustomed to what I may call barrack-life, they are gradually trained in the riding-schools and taken out exercising on the drill ground ; at the age of *seven* taken into the ranks. Imagine how docile all the horses are. They looked a useful lot, but a bit heavy and under-bred and not up to much pace. The officers told me that they were not. I might mention here that I happened to see a moving photograph of a French Cavalry regiment charging. Judging from the photograph, the pace seemed very slow, and when the troops halted they were all very much opened out. Unless readers have seen this new moving photography they may scoff at my remarks, and say that the pace looked slow because it was only a photograph. I saw, however, when at home a photograph of the Derby, and the pace looked perfectly correct in that !

An exercise I saw the recruits doing struck me as a particularly useful and practical one, *viz.*,

(10) " Voltige."

"voltige." In a large open shed, three squads of men were drawn up. Three horses, one in front of each squad. In front of, say, squad A, a horse is lunged round like in a circus. Each man in squad A in turn runs alongside the horse and vaults on and off it, then vaulting on again rides a couple of times round the ring with arms crossed. Excellent practice for giving men confidence, perfectly safe, and all the men seemed to thoroughly enjoy it.

Opposite squad B the horse is standing in front of the squad held by the instructor. Each man runs up and vaults on to it like the horse in a gymnasium. Opposite squad C is a third horse, and each man vaults sideways on to this like the horse in a gymnasium from near side to off side, and *vice versa*. I was specially struck with this "voltige."

Lebel carbines. I wasn't impressed with them. Huge bolts on right hand side. Three cartridges in magazine. They seemed heavy and clumsy weapons. The men always carry them slung, and have no carbine buckets. The sword seemed very good; long, very slightly curved, well balanced. Good weapons for pointing with.

Squadron officers are entirely responsible for training their remounts and recruits—admirable of course in theory and practice, but impossible with Native Cavalry in India. In France recruits and remounts all arrive *once* a year on a regular fixed date. With us recruits and remounts come at all times.

In conclusion, I cannot speak too highly of the courtesy shown by the French officers to me, and it would surprise many to learn how very good French Cavalry are, and how different from reality are our prevailing notions respecting them.

INCREASE OF BRITISH OFFICERS FOR THE NATIVE INFANTRY.

BY MAJOR A. W. T. RADCLIFFE, 14TH SIKHS.

The question with regard to the increase of British officers to regiments of native infantry has been lately brought much before the notice of the public ; and I think it is now generally admitted that the present complement of eight combatant British officers to each infantry corps, though sufficient perhaps to enable the regiment to perform the duties required of it in peace time, is not sufficient to enable a native infantry regiment of 900 sepoys to stand the strain and losses of British officers involved in a war against any European enemy. It is now an accepted fact that the Indian regiments are intended to take their place when required in line with British regiments in the event of a war with a civilised power : this, being so, it behoves the country to organise in time of peace the army of the Indian Empire. The question to be considered then, is, how can this be done with special reference to the increase of British officers to each regiment of infantry of the Native Army ? This can only be done by spending money and, there's the rub ! It would surely be better to have even smaller number of troops, properly and efficiently officered, than masses of armed men without leaders ; so if the expense is too great to give an increase of officers to each regiment, I should recommend that, in the first instance, only a portion of the Indian Army should be given a suitable number of the officers so urgently required. I would begin by placing the Panjab Army Corps on a proper war footing with regard to British officers ; the other army corps to be dealt with in the same way according as the financial state of the country might permit.

The next point to be considered is how many officers are required to make a native regiment efficient in time of war as well as in time of peace. In my humble opinion, there should be at least twelve combatant officers to each regiment, and

that the constitution of an infantry regiment should be as follows :—

	Rank.
Commandant . . .	Lieutenant-Colonel,
2nd-in-Command . . .	Major or Lieutenant-Colonel,
Eight Company Commanders . . .	Captains or Subalterns,
Adjutant . . .	Subaltern or Captain,
Quartermaster . . .	Subaltern only,

or a total of twelve British officers instead of eight as at present.

I should strongly recommend the abolition of the system of wing commands. It is impossible for one officer to thoroughly train over 400 men; and, moreover, the "wing" is not, and never can be, a "unit" command. The unit command in an infantry regiment is a company, in the same way as the squadron is the unit of a cavalry regiment. In the Bengal Cavalry the present organisation works well, and why? Because the unit, which is the squadron, is complete in itself with its British squadron commander and his squadron officer. I would introduce the same system into the native infantry and have each unit—the company—complete in itself and commanded by a British officer.

I would not recommend that the present ranks of Subedar and Jemadar should be abolished, as the native commissioned ranks are useful as a link between the British officer and the men he commands, and besides the prospects of promotion to the commissioned grade is a great incentive to enlistment. It has been suggested that the native officer might be trained to take the place of his British leader; but this could never be, as the native of this country, although a grand soldier when led, would never be the equal of his British officer in the many qualifications which an officer must possess to be a resolute leader of men.

The 2nd-in-command should, like in a British regiment, assist the officer commanding in supervising the work of the regiment and should be ready to take his place as his "locum tenens." His duties should be the same as those of the 2nd-in-command of a British regiment.

With regard to the question of the expense entailed by the proposed organisation, it is not within my province to enter; but it is presumed that the pay would, as far as possible, be sufficient to attract the best and smartest young officers into the Native Army.

PARTISANS OR BANDITS?

BY CAPTAIN R. G. BURTON, 1ST INFANTRY, HYDERABAD
CONTINGENT.

In the April number of this Journal, Major Yate has objected to my use of the term 'partisan operations.' This objection appears to be sufficiently answered in the editorial note subjoined to Major Yate's criticism.

With regard to my application of the term 'bandit' to the Spanish guerillas, I would refer my readers to the History of the Peninsular War and to Napier's own opinion of the *partidas*.

Far be it from me to apply any opprobrious term to men—actuated by patriotic motives, and not by mere lust for gain—fighting to repel an invader from their fatherland.

Yet a comparison of the Spanish guerillas with the Carlists and Garibaldians would hardly be flattering to the latter, and the operations of these several parties can scarcely be placed in the same category.

I do not think that Englishmen who have read Napier's History would cavil at the term 'bandit' being applied to men whose operations, generally speaking, were characterised by murder, robbery, and rapine—practised not only on their enemies but on their compatriots also.

I say generally speaking, for there were of course exceptions, of which a brilliant example is afforded by the actions of Espoz y Mina.

For easy reference I will make a few quotations from Napier's "History of the Peninsular War":—

"It was at this period that the *partidas* first commenced the guerilla, or petty warfare, which has been so lauded, as if that had been the cause of Napoleon's discomfiture. Those bands were many, because every robber who feared a jail, or could break from one; every smuggler whose trade had been interrupted; every friar disliking the trammels of his convent; every idler who wished to avoid the ranks of the regular army was to be found either as chief or associate in a *partida*. The French, although continually harassed by the cruel murder of isolated soldiers and camp followers, and sometimes by the loss of convoys and strong escorts, were never thwarted in any great object by these bands; but the necessity of providing subsistence, and attaching men to his fortunes, forced the guerilla

chief generally to plunder his own countrymen ; and one of the principal causes of the sudden growth of the *partidas* was the hope of intercepting the public and private plate, which, under a decree of Joseph, was being brought to Madrid."—Book VII, cap. 4.

Again the historian says—

"Where every person makes war in the manner most agreeable to himself, there will be more robbers than Generals. Almost the first exploit of Espoz y Mina was to slay the commander of a neighbouring band, because, under the mask of patriotism, he was plundering his own countrymen The atrocities committed against their own chiefs disgusted the most patriotic, abated their zeal, and caused the middle classes to desire peace as the only remedy of a system so replete with disorder."—Book IX, cap. 1.

Again, referring to the *partidas*—

"The French slew numbers, most of them robbers, who pillaged their own countrymen."—Book XI, cap. 2.

In Book XIII, cap. 1, referring to a successful operation of the student Mina—

"Success was alloyed by the death of two hundred of the Spanish prisoners killed in the tumult, and horribly stained also by the cold-blooded murder, after the fight, of six Spanish ladies attached to French officers."

After reading the above, we must agree with Captain Burton that Englishmen who have read Napier's Peninsular War would, as a rule, apply the term "bandit" rather than "partisan" to the majority of the Spanish guerillas who harassed the French during the war.

**SOME FOREIGN ARTICLES OF SPECIAL INTEREST
CONTRIBUTED BY THE INTELLIGENCE BRANCH.
TRANSLATED BY P. H.**

**EXPERIMENTS IN CROSSING RIVERS DURING THE
AUSTRIAN CAVALRY MANŒUVRES, 1895.**

During 1895, some special cavalry manœuvres were carried out in the presence of the Emperor, in the neighbourhood of Buda-Pesth.

One of the most interesting items in the programme was the crossing of the river "Theiss" by a whole cavalry brigade and a horse artillery battery on 18th and 19th September, the object of this experiment being to test certain appliances at present used by the Austrian Cavalry and fix on a regulation pattern.

The following were the patterns tested:—

(1) *Water-tight canvas folding boat*, as used by the German Cavalry.

(2) *Water-tight sacks*, invented by Captain Bekessy. These sacks are the same shape and size as ordinary grain sack, and can be used for ordinary purposes, such as carrying grain, etc. When used as rafts, they are stuffed with hay, straw, clothing, or anything that comes handy. Each raft is formed by four sacks, three swords, and one rope, and carries the saddles, harness, and equipment of four troopers. The men themselves sit astride the sacks, and drag their horses after them, along the sides. The time occupied in making the raft was about eight minutes, and it took about the same time to unload and mount after reaching the further bank.

(3) *Water-tight tents*, also invented by Captain Bekessy. Like the new portable infantry tent, this consists of two portions, and accommodates two men, each portion being carried by one trooper, and easily made into a sack. They are used in the same manner as No. 2, above.

(4) *India-rubber bags*, invented by Lieutenant Colonel Erbe, 4th Dragoons, and (5) *Abele's india-rubber bags*, the same shape as the grain-sacks but larger. Both these appliances are blown out and hermetically sealed. Six of them are tied together with laths, and covered with planks, forming a raft for the transport of the men and their equipment.

When crossing the Theiss at Zenta, where it is about 200* mètres broad, it was found that all these appliances were excellently adapted for patrols or small parties, but not for larger bodies.

In view of these experiments, the following suggestions seem to recommend themselves as affecting cavalry and increasing their efficiency in the field:—

Each regiment should be accompanied by a light raft equipment carried on a cart.

Each trooper should be equipped with one water-tight bag for his own use.

* Two hundred and eighteen yards.

Both men and horses should be constantly practised in crossing rivers, so that they may become quite *au fait* in the management of their rafts, and may be able to shift for themselves in an emergency, and that the horses may be trained to swim.

From the "Deutsche Heeres Zeitung."

THE NEW SWISS RIFLE.

The "Allgemeine Schweizer Militär Zeitung" reports that the new rifle, as submitted by the Military Department, has been accepted by Government. Its official designation is the "Repeating Rifle, Model, 1889-96." The breech has been shortened and the breech pins set forward. The latter question had been under consideration, as early as 1888, by the Technical Small Arms Committee (consisting of Colonel Gressly, Colonel Von Mechel, and Professor Amsler), with a view to strengthening, not only the breech, but the whole system. Nothing was, however, done until 1892, when the matter was once more taken up. Since then Master Armourer Vogelsang has succeeded in constructing a model on the proposed lines.

Both during this and previous years, experiments with the new rifle proved that the breech worked more easily, jamming was avoided, and the rifle was easier to fire with.

The extra expense comes to about 50 centimes per rifle, and it is worthy of note that the Government have decided to supply a new lot entirely and not convert the old ones. The drill remains the same as before, and there is nothing complicated about the new weapon.

The various advantages claimed for the new model are as follows:—

(a) By setting the breech forward—

- (1) The breech is stronger, and the whole system has been strengthened. With the long breech the balance was in the centre and not in the rear portion.
- (2) The component parts of the breech are less liable to break, the pressure being on the pins only and not on the whole breech as before.
- (3) A pressure of 2,400 to 2,600 can be exerted when firing.
- (4) The breech is easier to open, and, the lever being further forward, jamming is less likely to occur.
- (5) The cylinder of the breech vibrates less, and the magazine has a firm base for the recoil. By this means also the shooting of the rifle is improved.

(b) By shortening the breech—

- (1) It is easier to work, there is less friction, and the bolt has less space to work over.
- (2) The butt is two centimetres longer, by which means a soldier can fire in a better position, recruits are less frightened, and far better results are obtained.
- (3) The weight of the rifle is diminished by 100 grammes.

From the "Vedette."

A MAGAZINE PISTOL.

A full description of this new weapon is given in a brochure, published by the inventor, Theodore Bergmann, who is also proprietor of the well known factory in Gaggenau, Baden. The book is accompanied by sketches and plans showing the mechanism. All the disadvantages of the ordinary revolver have been removed, and when the writer of this notice had occasion to fire a few shots with it, he was astonished at its accuracy, even when firing rapidly. It is a handy weapon, and although it appears somewhat heavy, the largest bore (6.5 millimètres), actually weighs less than the 1883 model. Owing to there being no gas escape the penetration is greater in spite of the small size of the bullet. The charge consists of smokeless powder, and the bullet is covered with a nickel steel casing.

It is of course only by extensive experiments that the question of its practicability can be decided, and it is not known whether there is any intention of making such experiments. In any case the new weapon is likely to attract considerable attention in scientific circles. It is stated that 20 rounds can be fired in 25 seconds.

AUTOMOBILES.

A most successful experiment has been made with "automobiles" on the road from Paris to Marseille.

Of the eight carriages competing, the winner completed the distance (exclusive of stoppages) in 68 hours, and the last in 82 hours. The total distance was 1,700 kilometres (1,054 miles). The rate attained by the winner was 15½ miles an hour, and by the last, 12¾ miles an hour.

It is anticipated, states the "*l'Avenir Militaire*," that before long all departmental and medical stores will be carried by automobiles in the field.

From the "Militär Wochenblatt."

Prize Essay Gold Medallists.

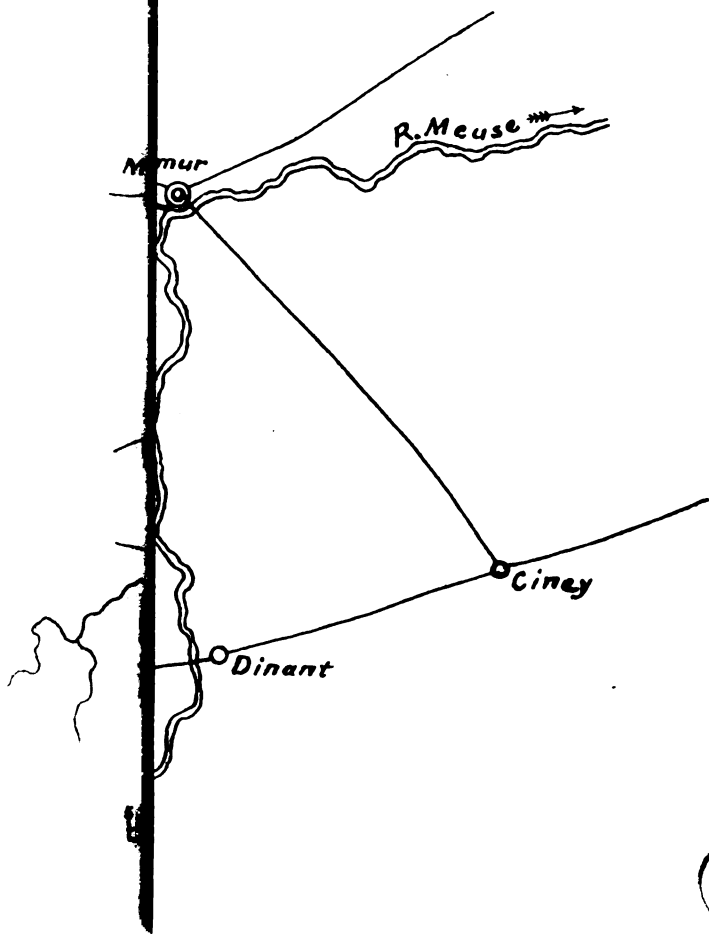
- 1872.....ROBERTS, Lieut.-Col. F. S., V.C., R.A.
 1873.....COLQUHOUN, Capt. J. A. S., R.A.
 1874.....COLQUHOUN, Capt. J. A. S., R.A.
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 1880.....BARROW, Lieut. E. G., S.C.
 1882.....MASON, Lieut. A. H., R.E.
 1883.....COLLEN, Maj. E. H. H., S.C.
 1884.....BARROW, Capt. E. G., S.C.
 1887.....YATE, Lieut. A. C., S.C.
 1888.....MAUDE, Capt. F. N., R.E.
 YOUNG, Maj. G. F., S.C. (specially awarded a silver medal).
 1889.....DUFF, Capt. B., S.C.
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MacGregor Memorial Silver Medallists.

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 1896.....COCKERILL, Lieut. G. K., 28th P. I.
 1896.....GHULAM NABI, Private, Q. O. Corps of Guides.

ROUGH SKETCH OF THE
CIRCUIT ROUND WATERLOO.

To Liège. 20 Miles.



Prize Essay Gold Medallists.

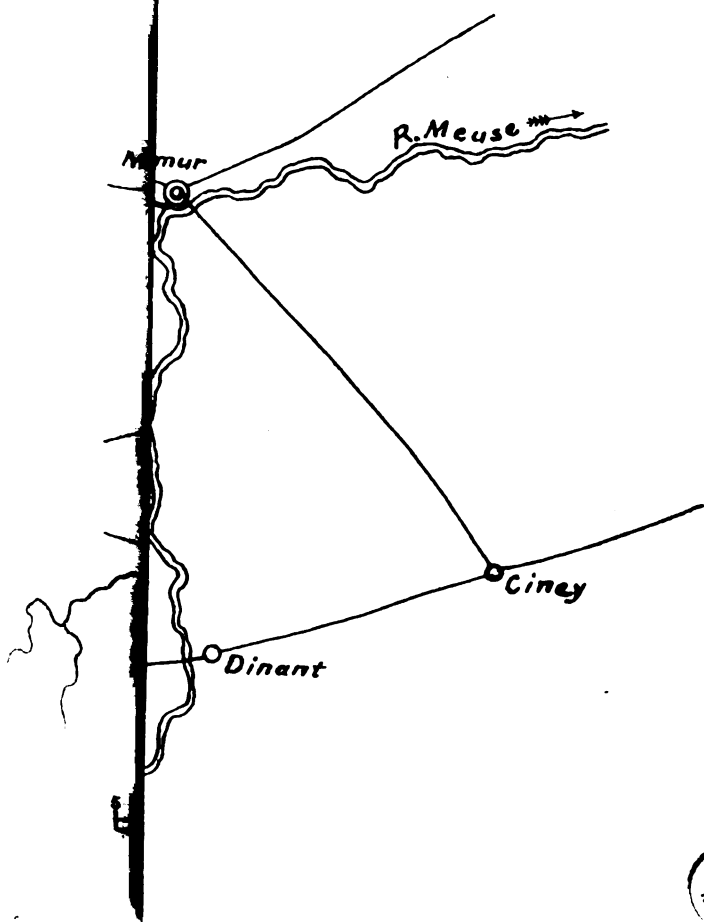
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The Journal
OF THE
United Service Institution of India.

VOL. XXVI.

1897.

NO. 129.

THE FORTUNE OF WAR.

A LECTURE GIVEN AT SIMLA BY COLONEL H. D. HUTCHINSON.

“War is a terrible thing from every aspect; but in none is it more so than in its awe-inspiring uncertainty, and the chances which affect its results.”—*Lord Wolseley.*

YOUR EXCELLENCY, LADIES, AND GENTLEMEN,

The last time I had the honour of addressing you in Simla I told you “the story of Waterloo”—a well-worn story indeed, but one to which an evergreen interest attaches, and one to which English men and English women will always listen with attention. This afternoon I have nothing to set before you which can compare at all with the glorious story of Waterloo in richness of historical association, in interest of dramatic situation, or in the excitement which is provoked when deeds of heroic endurance, and noble valour, are narrated. Yet even without these stirring aids the subject which I have chosen for this afternoon’s Lecture—“The Fortune of War”—will, I hope, be found of sufficient interest to enable you all to listen for a short hour without being wearied: and will further, I trust, furnish you with some little instruction, and food perhaps for healthy reflection. Does not Shakespeare say somewhere—“There are more things in heaven and earth, Horatio, than are dreamt of in your philosophy:” and so, in the course of my address this afternoon, I propose to show you that there are

A

more things in war, more strange things, that is, in war, and in the lives of men whose business is war, than are dreamt of, or than could be invented, by any of us; but which are nevertheless true, and the effect of which, whether on the careers of individuals, on the fate of battles, or on the fortunes of States, has often been far-reaching, decisive, and indelible.

Probably every one here this afternoon will readily admit that there is such a thing as fortune: and that fortune, which influences so largely not only the actions and lives of men, but also the affairs and destinies of States and Nations, is a factor neither to be eliminated from, nor ignored in, our calculations. We do not of course all talk of this thing by the same name. Some of us speak of it as chance or luck: others refer to it as fate: and others again mention it with reverence as Providence. But call it what you will, it is certain that no person, whatever his rank, or station, or profession, can go through life without having some strange experience to relate, or some curious coincidence to recount, which has sensibly affected his own career, or that of some friend or acquaintance, which he will ascribe, according to his temperament, to fortune, or luck, or Providence, and which he can account for in no other way.

But perhaps nowhere are the freaks of fortune more noticeable than in connection with war. History teems with incidents in which great military issues have turned literally upon some lucky or unlucky stroke of fate. A great General has told us himself that in his opinion "after the finest combinations have been planned by the ablest commanders, three-fourths of the result will still depend upon chance." This is, perhaps, a somewhat sweeping assertion to make, but it is undoubtedly true that many besides Turenne have held this belief, and that many famous captains, including the great Napoleon himself, have trusted much to Fortune; while all nearly, at some time or other in their lives, have owned their indebtedness to the smiles, or have ascribed their disasters to the frowns, of the fickle goddess. It will be interesting, and not uninteresting, to note some of the more striking cases that have occurred, and perhaps we cannot begin better than by examining the careers of those famous rival leaders Napoleon and Wellington, and observing how their great destinies were affected, and, so to speak, launched into conquering grooves, by incidents or accidents, which at the time of their occurrence could not by any possibility be supposed to have such a vital significance.

To speak of Napoleon first. In the autumn of 1793, long before ever he was known to fame, France was in a state of anarchy and rebellion. The Republican Government at Paris, styled the Convention, enforcing its cruel mandates by a reign of bloodshed and terror, was engaged in endeavouring to reduce to subjection the provinces of the south which had revolted against its authority. One of its armies had taken Marseilles, and was now marching against Toulon, which city was at this time in the hands of the English. Their fleet under Lord Hood being in the roadstead, their aid had been invoked by the municipal authorities, who justly dreading the vengeance of the Convention whom they had defied, had called in the foreigner to help them. In a preliminary skirmish outside Toulon, at a place called Ollioules, Dommartin, the commander of the artillery of the Convention, had been seriously wounded, and it happened that there was no one present qualified to replace him. In this emergency, an officer named Cervoni, Adjutant General of the Republican Forces, was despatched in haste to Marseilles to try and find there some one capable of directing the artillery in the siege operations now about to be undertaken against Toulon. Fortune decreed a chance encounter in the streets of Marseilles with Captain Napoleon Buonaparte, a young artillery officer, who was then on his way from Avignon to Nice in charge of a convoy of ammunition. Cervoni was so much struck by his appearance and conversation, that he decided to offer him the command of the artillery of the army of investment. The offer was accepted, with the result that within a few weeks, so wise were the counsels of Captain Buonaparte, and so vigorous his measures, the place was captured, the English withdrawing to their ships, and abandoning the city to its fate.

Thus, through what was literally a happy chance, was this young unknown captain of artillery afforded the opportunity, when he was only twenty-four years of age, of showing the stuff he was made of. His General, Dutheil,* writing after the fall of Toulon to the Minister for War at Paris, said—"I fail in expressions to depict the merit of Buonaparte. A great deal of science, as much intelligence, and too much bravery: such is a faint sketch of the virtues of this rare officer. It rests with you, Minister, to retain them for the glory of the Republic."

* In a codicil to his will dated at St. Helena, in April 1821, Napoleon bequeathed the sum of 100,000 francs to the Lieutenant of Artillery Dutheil, great nephew of his General at Toulon.

This recommendation was not overlooked or forgotten. It ensured the honourable employment of Napoleon, who was made a General after the fall of Toulon, in the campaign of 1794, on the frontiers of Nice, in the course of which he increased his reputation : and in the spring of 1796, obtained for him the command of the Army of Italy, when he speedily brought to a close, by the victory of Montenotte, glorious to himself and to France, a war which had been wearily dragging on for nearly four years, and laid the foundation of a career which stamped him as the greatest soldier of modern times. Fourteen years later when, as Emperor of the French nation, and Dictator of Europe, he sought in marriage the hand of an Austrian Princess, the question of his noble birth was raised, and servile genealogists, anxious to prove him worthy by descent of an alliance with the royal house of the Hapsburgs, attempted to trace his ancestry back to an ancient line of Gothic Princes ; but Napoleon himself cut short these unworthy speculations by declaring bluntly that he dated his patent of nobility from Montenotte.

It is well known that Napoleon was a great believer in fortune, and I think you will agree with me, with this instance before you, that he had some justification for his faith.

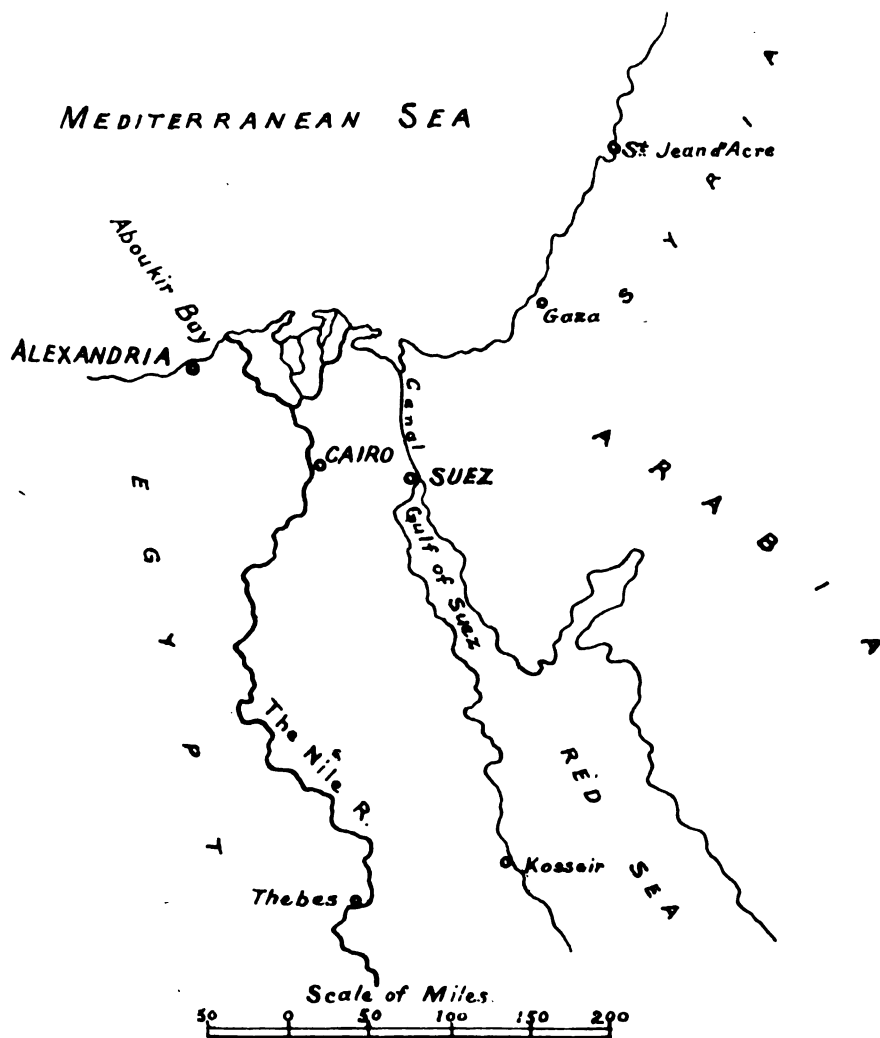
Before we proceed to speak of Wellington, we may take two more illustrations of the Fortune of War from this siege of Toulon. I have told you that when the place fell the English eventually withdrew to their ships which were anchored in the roadstead. This was only after desperate fighting, but the capture by the Republicans of a position called from its great strength, and commanding situation, Little Gibraltar, rendered further resistance useless, so they embarked on their vessels, and prepared to put to sea. But this was not so easily done. A violent east wind prevailed, and prevented the fleet from leaving the shelter of the port. In the meantime where the ships were moored they were within easy range of Little Gibraltar, and Buonaparte, seizing on the opportunity offered, hastened the construction of a heavy mortar battery, the fire from which must soon have set them all ablaze, and destroyed them. Eagerly was the work pressed on, but the Fortune of War decreed that neither on this occasion, nor on any other, should a British fleet fall a prize to his arms. Before the battery could be completed and armed, the wind changed and the ships put to sea, and got safely away. You see, therefore, that a simple shift of the wind made a considerable difference on this occasion.

The other incident of the siege of Toulon that I would mention to you is this. The besiegers, though victorious in the end, did not by any means have it all their own way at first. The resistance was stout, the sorties by the invested garrison frequent, and the hand to hand fighting that ensued of the hardest. In one of these affairs, Captain Buonaparte was wounded by an English gunner, who drove a lance through his thigh, and he retained the mark of the wound all his life. When the post mortem examination of his body was made at St. Helena in 1821, the traces of this wound received at Toulon were distinctly visible. But this is not what I was going to tell you. It was on another occasion, standing in a battery in which the enemy's shots were falling thickly, and in which the casualties had been very heavy indeed, Buonaparte was dictating some orders to a young Sergeant who was seated on the ground writing, when a cannon ball, plunging over the parapet, pitched between them, and covered them both in a shower of earth and sand. No one was hurt, however, and the young Sergeant, flicking the dirt off the paper, said "That's all right; no need for blotting paper here!" Buonaparte was much struck by his coolness, and inquired if he could do anything for him. "You can, indeed" was the reply; "you can change these if you like," touching his worsted shoulder cords, "into golden ones!" Needless to say, Buonaparte did not forget his comrade; the young Sergeant's promotion was rapid after this, and he was known to fame in later years as Marshal Junot, Duke of Abrantès. He certainly owed something to the Fortune of War.

But if Fortune had something to say to the shaping of the career of Napoleon, her benign interposition was still more markedly exercised in the case of the Duke of Wellington. His first rude experience of war in the dreadful winter of 1794-95 in the Netherlands ended, he was ordered with his regiment, the 33rd, to join a force directed against the French Settlements in the West Indies. In the autumn of 1795 the expedition sailed, convoyed by some men-of-war under Admiral Christian, but after six weeks' buffeting by adverse winds the ships were all driven back to Portsmouth by storms and stress of weather, and the proposed operations were abandoned. A few months later, the 33rd were ordered to India, and arrived in Calcutta in February 1797. The destination of the regiment was thus accidentally changed, and Colonel Wellesley, as he then was, found himself in the East, instead of in the West Indies, and there commenced that

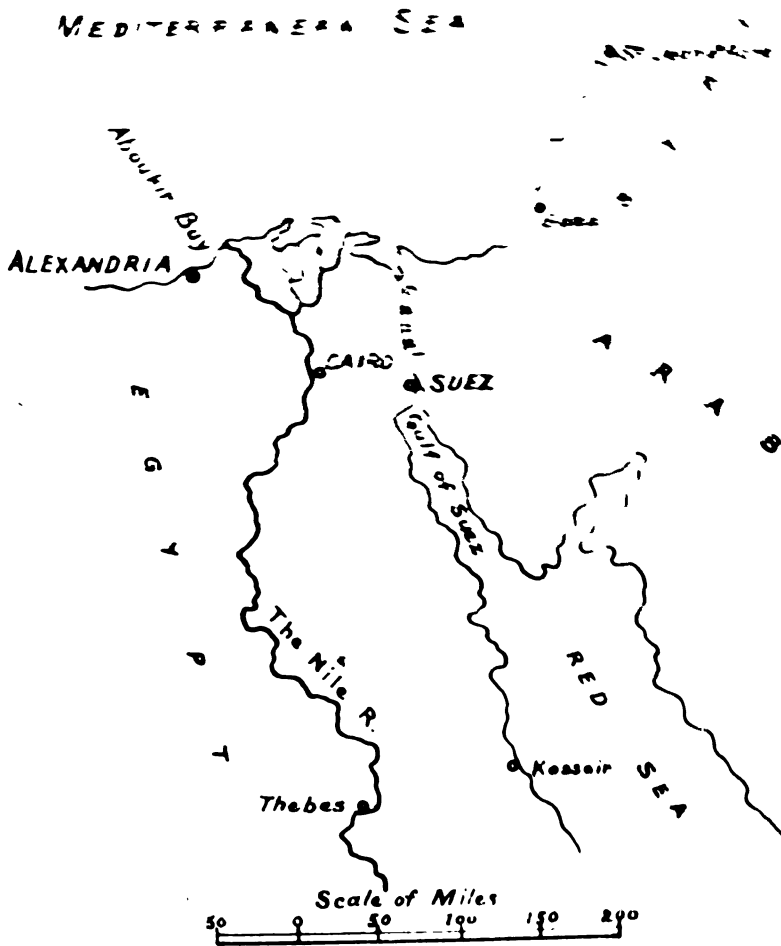
great and conquering career which led him eventually from victories over Mahratta hordes to triumphs over Napoleon's best Marshals, and culminated finally in glory at Waterloo, where he overthrew the great Emperor himself ! Who shall say how the fate of India, of Europe, and of the world, was affected by those warring elements that drove back Admiral Christian's fleet, and defeated all its attempts to gain the shores of the West Indies ?

But even when Fate had transported him to India, Colonel Wellesley on one memorable occasion did his best to escape from the country, and was certainly at the time very wrath that he did not succeed. To explain this incident, which has a strong bearing on our subject, I must remind you that in May 1798 Napoleon led an expedition to Egypt, the avowed object of which was to conquer and colonise that country and through this achievement to upset English rule in India. At first, all went well. He had with him a fine fleet and some 40,000 men on transports, and was accompanied by generals like Junot, Berthier, Desaix, Kléber, Lannes, Marmont, and Murat, all destined to write glorious names for themselves in the future on the pages of history. The English fleet under Nelson, which might well have intercepted him, was driven out of his way by opportune storms. On the 12th June he captured Malta, and on the 2nd July he landed successfully at Alexandria, and a few days later, after defeating the Mamelukes in more than one fight, he established himself at Cairo. But now came news of disaster. Nelson had at last succeeded in finding the French fleet in Aboukir Bay, and on the 1st August he attacked, and destroyed it utterly. This misfortune left Napoleon in rather a tight place. His designs against India were of course crushed by the blow that had fallen, and his own safe return to Europe with his army seemed now at least problematical. For some months longer he remained uncertain in Cairo, but hearing that the Turks in Syria were preparing an army to attack him, he marched against them in February 1799, defeated them in several engagements, and early in March approached St. Jean d'Acre, and laid siege to it. But here the Fortune of War declared against him. Admiral Sir Sidney Smith, commanding an English squadron cruising off the coast, opened fire on the French as they approached the shore, and was surprised to find his fire answered only by musketry. In a moment he divined that the French siege artillery was to come from Alexandria by sea, and very speedily he discovered and captured the ships that carried it. Without his artillery, Napoleon



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could effect nothing against St. Jean d'Acre, supported as it was by the English, and supplied from the sea. After wasting two whole months before the place, he abandoned the enterprise, and commenced a retreat (which was a period of horrors almost too dreadful to describe) to Cairo, which was reached about the middle of June : and on August 22nd (seeing that Egypt was played out) he sailed with two frigates for France, taking with him only Berthier, Lannes, Murat, and a few others, and arrived at Fréjus after a six weeks' voyage, during which he narrowly escaped capture by the English fleet.

Well, you will say, what has this long digression to do with Wellington? I will try to explain. On the departure of Napoleon, General Kléber was appointed to the command-in-chief of the French forces in Egypt. He was a wise and able Governor, and under him all might have gone well for the French, but most unfortunately, he was assassinated by a fanatical Arab in June of the following year (1800), and the command then devolved upon an officer called Menou, a man whose ambitious schemes, and extraordinary conduct, resolved the British Government to take effectual measures, which they had long contemplated, in alliance with Turkey, for expelling the French from the country. These measures comprised the despatch of an expedition from England under Sir Ralph Abercromby, and of an auxiliary force from India under Sir David Baird. Now, Wellington, or Colonel Wellesley, as he should still be called, fully expected to command this Indian contingent himself. It was a force which had been originally collected at Trincomalee, in Ceylon, and designed under his command to annex the island of Java ; but at the last moment, in consequence of instructions from England, it was sent round by sea to Bombay, and its destination changed to Egypt. Colonel Wellesley, who had worked hard at organising and equipping it, confidently expected to proceed in command of it himself, and he was greatly disappointed, on arrival in Bombay, to learn that Sir David Baird had been appointed to the command-in-chief, while he was nominated only 2nd-in-command of the expedition. His own brother, the Marquis of Wellesley, was at this time Governor-General of India, and he complained to him bitterly of what he described (not with justice, however, for Sir David Baird was his senior) as his unfair supersession. Notwithstanding he would certainly have gone to Egypt as General Baird's 2nd-in-command, if

he had not at this juncture fallen ill, so that he stayed behind, and it sailed without him.

Now I think you will agree with me that fortune, or an all-wise Providence, call it what you will, had something to say to the shaping of Wellington's career about this period. It certainly was not his own fault that he did not leave India at this time, but there was other work for him to do, and the stars in their courses decreed that he should stay in the East, and "against the myriads of Assaye clash with the fiery few, and win," and so gradually build up, and establish, that name for intrepidity, resolution, and sagacity, which marked him out later as the leader of England's armies against the hosts of France, and enabled him to triumph over them all.

It may interest you to note in this connection that a voyage from India to Egypt in sailing ships was not in those days the simple matter that it is now in steamers. Sir David Baird's expedition sailed from Bombay on the 5th April, 1801, but did not succeed in reaching Kosseir, about 250 miles south of Suez, until July, after losing two transports on the way. As after this it had some 140 miles of desert to cross before striking the Nile at Thebes, and then 300 miles more to travel in boats to reach Cairo, you can understand that timely co-operation between it, and Sir Ralph Abercromby's force, was not to be depended upon, and as a matter of fact the battle of Alexandria (21st March, 1801), in which the gallant Abercromby was killed, was fought and won long before Baird's contingent appeared upon the scene. Cairo, too, had surrendered to the English (21st May, 1801). But Alexandria still held out, and in the vigorous and successful operations for the reduction of this last stronghold of the French in Egypt, the Indian Division took an honourable part. The baggage of officers was not in 1801 cut down to 80 lbs. apiece as it is in 1897, and Alison tells us that "the officers and soldiers from England were much struck by the luxury of their comrades in the Indian service, and accustomed as they were themselves to sleep on the bare sand, they beheld with astonishment the numerous retainers, and sumptuous equipages of the Indian Contingent, which attested the magnificence of Asiatic warfare!"

We have changed all that in 1897, and I daresay if the officers and men with the Tochi Expedition were required to show their kits now, they would not reveal a great deal of Asiatic splendour or magnificence!

I have now narrated to you some incidents in the early careers of two very famous Generals, which undoubtedly had a

marked effect upon their after lives and fortunes. Before I speak of strokes of fortune which have clearly decided the issue of battles, or the fate of armies, I will tell you of one more famous General (though he is not of course to be in any sense compared either with Napoleon or with Wellington) who, commencing life in the ranks as a private soldier, finished it on a throne, and when he died, after a reign of twenty-six years, left behind him the reputation of being a wise and good king. He emphatically owed something to the Fortune of War.

The man I refer to was Bernadotte, Marshal of France, Prince of Ponte Corvo, and (as Charles XIV.) King of Sweden and Norway. Bernadotte's career was really marvellous, and assuredly he was born under a lucky star. Commencing in the humblest grade in 1780, he fought his way up to the command of a Division in 1794, and ten years later gained a Marshal's bâton, while in the following year, for his distinguished share in the great victory of Austerlitz, he was created Prince of Ponte Corvo. In the next year (1806) occurred the incident which afterwards made his fortune, though no one could have guessed it at the time. In that year Napoleon at Jena and Auerstadt, both battles fought on the same day in the same neighbourhood, destroyed the military power of Prussia. At the former place, he was in chief command himself: at the latter, Marshal Davoust directed the operations. The corps of Bernadotte was so disposed before the action at Auerstadt commenced that it could have effectively co-operated with that of Davoust, but Bernadotte was jealous of him, and disinclined to serve under his orders, so relying on an ambiguous sentence in the instructions sent by the Emperor, he refused to move to his support. As it happened, the greater was the glory reaped by Davoust, for by skilful dispositions, and resolute handling of his force, he won a great victory over tremendous odds. Napoleon was furious when he heard of Bernadotte's inaction: "If I was to send him to a council of war," he said, "nothing could save him from being shot." Meantime his corps being perfectly fresh, while all the others had lost heavily, he was despatched by the Emperor in pursuit of the flying foe, whom he overtook and defeated first at Halle, and then with Soult's assistance, at Lubeck. Now Fate decreed that at the very time that Lubeck fell, some ships bringing a division of Swedish infantry, sent by Gustavus IV. to help the Prussians, should enter the port. The Swedish troops had hardly landed, when attacked by the French, and, abandoned by the

Prussians, they had to surrender at discretion to Bernadotte. This Marshal (Marbot tells us in his admirable memoirs) had a most engaging manner, and could be extremely pleasant if he liked. He now was at great pains to pose before his prisoners as a man of magnanimous and generous disposition. He accordingly treated the Swedish officers with great affability, granted them honourable terms of surrender, restored them their horses, and baggage, provided for all their wants, and inviting their chief, Count Mœrner, to his own quarters, overwhelmed him with kindness and attention, so that on their return to their country the Swedes were all loud in their praise of Bernadotte. All this happened, you will recollect, in 1806. Two years later there was a revolution in Sweden. The king, Gustavus Adolphus, was compelled to abdicate, and was succeeded by his uncle, the Duke of Sudermania, who ascended the throne as Charles XIII. But he was childless, and as it was necessary to nominate some one as Crown Prince and heir to the throne, a Prince of the house of Holstein was selected for the honour, but he died suddenly in 1811, without heirs, and the Swedes had then to look abroad for some one to fill the vacant place, to which indeed there were many aspirants at once. At this juncture, while various claims were being canvassed, Count Mœrner proposed Bernadotte, and mindful of his generous and humane treatment of their troops (his prisoners) in 1806 at Lubeck, the suggestion was at once welcomed by the whole nation, and finally acquiesced in by Napoleon, who, though he disliked Bernadotte personally, and had expressed his opinion of his conduct in no measured terms after Jena in 1806, and again after Wagram in 1809, yet recognised his great ability, and thought perhaps that by permitting him to occupy the throne of Sweden, he would ensure his assistance and co-operation in carrying out his own plans and designs in Europe, whatever they might be. In this view Napoleon was very much mistaken. But that is another story on which I will not touch now. It was not, however, without some difficulty that the Emperor was finally induced to approve of the nomination of Bernadotte as Crown Prince and heir to the throne. "What," said Bernadotte to him, when he still hesitated, "will you make me greater than yourself by making me *refuse* a Crown?" The sarcasm told, and Napoleon merely replied "Go! our fates must be accomplished!" From that time Bernadotte devoted all his energies to the interests of his adopted country, which never had cause to regret its choice. I think we may concede

that the Goddess of Fortune had him under her special protection.

I may now proceed to give you some examples of battles lost, or won, through purely accidental circumstances, and these perhaps will impress you more with the large share that fortune plays in war, because the result is more directly and immediately seen. Napoleon used to say "that a battle sometimes decides everything, and sometimes the most trifling circumstance decides the fate of a battle." This is so true that hardly any battle can be examined closely, even from those Biblical days when we are told that a certain man drew a bow at a venture, and smote King Ahab between the joints of his harness, down to the present time, in which fortune has not played a conspicuous part. Sometimes it is an order miscarried, or misunderstood: sometimes it is the weather, an unexpected frost, or thaw, or a sudden flood in a river: sometimes it is sleep—sleep at the wrong time, *bien entendu*: sometimes it has been a question of the health of the Commander on one side or the other: and sometimes it is accident, pure and simple, which has affected and decided the result of a great battle, or military operation. History at all events teems with such examples, and my only difficulty has been to make a suitable selection to put before you.

We will begin with the Waterloo Campaign, because its leading incidents are familiar to most of you. It literally bristles with instances which illustrate the Fortune of War.

Napoleon's plan in this campaign was to cross the Sambre at Charleroi, and move rapidly upon Brussels, thrusting himself in between the allies, the English and the Prussians, who, he calculated, would then recoil upon their respective bases—the one to the north, the other to the east—and might then be attacked and destroyed separately. The success of this plan depended upon the secrecy of his movements, and the rapidity with which they were carried out. He left Paris himself for the front on June 12th, well neither in body nor mind. "He was fully aware," says Lord Wolseley (in his interesting book, *The Decline and Fall of Napoleon*) "that he was not now physically the man he had been in the glorious past, and his mind was full of care. A firm believer in luck, all had gone so much against him during the three previous years that he scarcely dared to trust in fortune now. 'Ah,' said he, 'you do not know what a force good luck is! It alone imparts courage! It is the feeling that fortune is with us that gives us the hardihood to dare,

Not to dare is to do nothing of moment, and one never dares except as the result of good luck. Misfortune depresses and blights the soul, and thenceforward one does nothing good.' " At sometime or other in our lives, I expect all of us have realised what truth there is in these sentiments.

By the 14th June, his army was assembled within a short march of Charleroi, where Zieten with 32,000 Prussians blocked the way. The Emperor's orders, issued from Beaumont (see map), now were to move to the attack at 3 A.M. on the 15th, the object being to sweep Zieten out of his path before he could be reinforced, and *by the same evening* to occupy Quatre Bras and Sombref, before the allies could join their forces on this line to oppose him. But now occurred an accident which frustrated the complete execution of this plan, and had, in fact, a vital bearing upon the issue of the campaign. The corps of Vandamme lay in front of the central column, and it should of course have been the first to start. But Vandamme received no orders! Why? Because on the evening of the 14th he could not be found! He had gone off to sleep at a house some distance from his corps, and had not left his address! The orderly officer who wandered about during the night, endeavouring to find him, eventually fell from his horse, and broke his leg. He lay helpless for some time, and thus the order was never delivered to Vandamme, whose division consequently remained tranquilly in bivouac, until Lobau's corps, which had started at 4 A.M., came up from behind, when the state of things was with difficulty explained. Napoleon himself called this incident a "*funeste contretemps*." It caused a delay at least of four or five hours on the 15th, at a time when minutes even were precious, and you can believe of what inestimable value this respite was to the allies, who were, in fact, somewhat taken by surprise by Napoleon's sudden irruption, and were not yet by any means prepared to meet him.

But it was on the next day, the 16th June, that one of the most extraordinary illustrations of the Fortune of War occurred that history records—an incident so remarkable that no one could possibly have contrived it, and the effects of which practically decided the issue of *two* pitched battles, and, it is hardly too much to say, the fate of the campaign. To understand clearly what happened I must briefly explain to you the situation on the 16th. The English Army, under the Duke of Wellington, was on the morning of this day engaged in concentrating on Quatre Bras. The Prussians under Marshal

Blücher had assembled three out of their four corps (totaling 83,000 men) at Ligny, where they were drawn out in battle-array, ready to fight if attacked : and the French, divided now into two armies—one of 47,000 men under Ney, and one of 73,000 under the Emperor himself,—were preparing to assault the allies in the two positions indicated. Now, several orders were sent from Napoleon to Ney on the 16th, but as the hours passed on, and more was known of the position and strength of the allies, it was finally arranged that Ney should drive the English out of Quatre Bras, and then detach one of his corps to fall upon the Prussian right flank, ascertained to be posted about Brye and St. Amand. As soon as this flank attack was developed, the Emperor would himself strike hard in front, and the result should be the defeat and destruction of the Prussian Army. But everything went wrong on this eventful day.

In the first place, although time was so precious, seven or eight hours of daylight were unaccountably wasted by Napoleon himself on the morning of the 16th,* and it was 11 o'clock A.M. before Ney, who was at Frasnes, received any orders at all ; and as his own columns were not even then closed up (and it was entirely his own fault that they were not), it was 2 P.M. before he commenced his attack on Quatre Bras. This delay was fatal. Not only did it give time to the Prussians at Ligny to complete all their preparations for a desperate defence, but what was far more serious (for the French !) it enabled the British, hurrying up from all quarters, to establish themselves in such strength at Quatre Bras that when at last Ney did attack that position far from being able to get possession of it easily, as he and Napoleon had anticipated, he met with such a determined resistance that he found himself quite unable to make any detachment for the attack upon the Prussian right flank, which had been ordered, and which was now anxiously expected by the Emperor.

However, tired of waiting for Ney's co-operation, Napoleon, at about 3 P.M., launched his own columns to the attack of the Prussian position at Ligny. The fighting that ensued was of the most desperate nature, and the Emperor very soon realised that instead of the 40,000 men which in the morning he had estimated to be opposed to him, something like double that

* " Had Napoleon set his troops in motion at 5 or even 6 A.M. on the 16th, the result of the day's fighting must have been very different. At a time when every hour was worth a reinforcement of 10,000 men, he allowed at least seven hours of daylight to slip by to no purpose."—*Decline and Fall of Napoleon*.—WOLSELEY.

number had to be reckoned with. Consequently he became more anxious than ever about Ney's support, and sent him from the battle-field an urgent despatch in which the following passage occurs: "Manœuvre at once to envelop the enemy's right, and fall with might and main upon his rear. His army is lost if you act with vigour. The fate of France is in your hands. Therefore, lose not an instant in making the prescribed movement, but march direct on the heights of Brye and St. Amand, and contribute to a victory which perhaps will be decisive."

Now, mark how from the moment these lines were penned, Dame Fortune interposed her pleasure, and took the management of affairs into her own hands. The aide-de-camp who carried this despatch to Ney, happened on his way to pass the head of D'Erlon's corps (part of Ney's command) and showed it to Durutte, who commanded its leading division, and on his own responsibility, ordered him to turn off at once to his right, and direct his march on Brye. This order Durutte obeyed. A little further on, the aide-de-camp overtook D'Erlon himself, who with his staff was riding in advance of his corps. He, on learning what had passed, at once rode off to join his command, sending an officer to inform Ney, and pressed the march on Brye, believing that in doing so he was only anticipating orders from Ney. About half past 5 in the afternoon, his corps was observed approaching the battle-field of Ligny, *but not from the direction in which it was expected*. Now at this very moment, the Emperor had set his Reserve in motion, the Imperial Guard, with the intention of deciding the struggle that was raging in his front. But, as luck would have it, D'Erlon's corps, when first seen, was mistaken for the enemy, and the Guard was halted while a reconnaissance was made to ascertain the facts. In two hours time, word was brought back that the troops seen were D'Erlon's corps, and not an enemy. The arrested movement was then continued at 7-30, with the result that the Prussian centre was pierced, and their army driven from the field. But the two hours lost by this contretemps, made just this difference, that the battle, instead of being over at 7-30 in the evening, was not ended until 9-30, when night had set in, and darkness coming on, stopped pursuit, and prevented Napoleon from completing his victory, as he otherwise assuredly would have done.

In the meantime, Ney, hearing of D'Erlon's movements, hotly pressed by Wellington, and stung by his own unexpected repulse, peremptorily ordered him back again, so that the

strange spectacle was afforded of a Marshal of France, with 20,000 men, receiving such contradictory orders that he spent the whole of this eventful day in marching backwards and forwards between the contending armies at Ligny, and Quatre Bras, without ever getting near enough to be of material assistance to either of them! For before he could return to Quatre Bras to support Ney, the Duke, who by nightfall had about 30,000 men on the ground, against about 21,000 with Ney, had assumed the offensive all along the line, and had driven the French back as far as Frasnes, where he left them for the night, while his own troops bivouacked on the field which they had so bravely maintained.

I think, Ladies and Gentlemen, if you have followed me in this description, you will agree that it was a most extraordinary freak of fortune that produced such remarkable results. They say that "Providence is always on the side of the big battalions," but most assuredly this was an exception to the general rule. Napoleon had "the big battalions" on the 16th June, but fortune was certainly not on his side, and a chain of untoward circumstances deprived him of his numerical superiority at a critical moment in *both* the battles fought by him on this day, with the consequence that he was beaten in one, and though victorious in the other, he was unable, through the lateness of the hour at which victory was achieved, to reap any fruit from his success.

On the other hand, says an able and well-known critic (Ropes), "it cannot be seriously questioned that the result of the action at Quatre Bras would have been a victory for the French if D'Erlon's corps had not been taken away from Ney. In fact, one may safely conclude that the battle of Waterloo would not have been fought at all, had this corps not been turned aside by the unauthorised act of a staff officer, because," he goes on to say, "it is altogether improbable that if Blücher had found that Wellington was in no condition to receive battle on the 18th, he would have deviated, after losing the battle of Ligny, from his natural course, which was to fall back on Liège or Namur."

However, interesting as these speculations may be, they are outside the scope of our subject, which is only to show what a large share was played by fortune in the operations of this eventful day.

I said a short time ago that sleep—that is, the fact of some one being asleep whom you would rather not venture to wake—might affect the issue of a battle. An instance of

this too occurred in connection with this memorable 16th June. I mentioned that at Ligny, Blücher had assembled three out of the four corps which constituted his army. The fourth corps, Bulow's, which was at Liège when the alarm was first given, did not get up in time for the fight as it certainly might have done. Why? Because no one dared to wake Blücher, who happened to be fast asleep when Gneisenau, the chief of the Prussian Staff, was sending out orders on the 14th June for the concentration at Ligny. Gneisenau was junior to Bulow, and so great was the respect for seniority in the Prussian Army in those days that he couched his instructions rather in the form of a request than of an order, with the consequence that Bulow, not realising that collision with the enemy was so imminent, postponed his start for twenty-four hours after receiving the despatch, and arrived too late to take any share in the battle of Ligny, the issue of which might have been very different if another 30,000 Prussians had been on the ground.

But the fiery and impetuous Blücher was not the only commander who was asleep at the wrong time during this momentous campaign. I have told you how Napoleon was ill in mind and body at this time. He was no longer the Napoleon of Marengo, or of Austerlitz. He had grown fat, he eat more, he slept longer, and he rode less. Further, a painful malady from which he had been a long time a sufferer, now attacked him oftener and with greater virulence. At such times, "he had great difficulty in keeping awake, and when under its influence his drawn features bespoke both physical pain and mental depression." After Ligny, he was so prostrated by the exertions and anxieties of the day, that he went to bed at once, in an exhausted condition, without issuing any directions for the night, or for the morrow. Grouchy wished to follow up the beaten Prussians at once, but no one dared to awaken the Emperor to ask for orders, so nothing was done. The next morning it was the same. His lethargic mood continued. He would see no one until 8 A.M., and even then it was impossible to elicit definite instructions from him. Consequently both wings of the French Army spent the precious early hours of the 17th in inactivity, while the Allies slipped away in safety, almost unmolested, and approached each other with deep design, confident now of being able to unite their forces and to confront the invader at last with every chance of beating him. Well may Vandamme have said to those around him: "The Napoleon whom we have known exists

no more ! Our success of yesterday will have no result !" Lord Wolseley declares in so many words that he believes the state of the Emperor's health to have been the primary cause of his final overthrow at Waterloo. He says : " I believe it was not so much the deep condition of the country after the heavy rain as a recurrence of this fatal malady on the morning of Waterloo, added of course to the fact that he did not expect Blücher's arrival on the field of battle that day, which caused him to begin the action so late, and so to throw away, without purpose, hours which might have been employed in destroying Wellington before the Prussians could arrive. We know that during the progress of the battle itself he remained for hours seated motionless at a table placed for him in the open, often asleep, with his head resting on his arms : also, that when flying beaten from the field, he suffered so much from drowsiness, it was with difficulty his attendants prevented him from tumbling from his horse. The more (he concludes) I study his grandly conceived plan of campaign for 1815 the more convinced I am that the overwhelming defeat in which it ended was primarily the result of bodily disease, and the failure of mental power which resulted from it at supreme moments when rapid and energetic decision was imperatively necessary for success."

Napoleon himself used to say—" *Health is indispensable for war, and nothing can replace it.*" It was the Fortune of War that in this last great struggle in which he was engaged, on which the fate of Europe, of the civilised world, depended, the state of his own health should have been such a weighty factor in the scale against him.

Ladies and Gentlemen, I have shown you now how in the course of only two or three days many all-important issues were affected and decided by such apparently trivial incidents as an accident to a messenger, an order misdelivered or badly expressed, or by the fact of a Commander being inaccessible because he was asleep, or unfit for work because he was ill. I might add to these examples of the Fortune of War in this campaign yet another, showing that even in the matter of the weather, the fates were against Napoleon. Between 2 o'clock in the afternoon on the 17th, and up to about 6 on the morning of the 18th, the rain descended in torrents, and put the whole country under water ; and, despite what Lord Wolseley has written (which I have just told you), there is plenty of evidence to show that one chief reason why the attack on the English position, which would have

had a much greater chance of success had it been commenced at 6 in the morning, was postponed until nearly midday, was that the ground was so soft and sticky that it was difficult to manœuvre on it until the water had drained off. This long delay was of course of inestimable value in allowing the Prussians to arrive to take their pre-arranged share in the battle.

I have, as a matter of fact, collected notes referring to many other occasions on which fortune has decided the fate of battles; but I find my hour has slipped away faster than I supposed, and I must not tax your patience much longer. Had time permitted, I should like to have told you how sudden floods in rivers have contributed to victories, and defeats, of which there were memorable instances in Spain in 1808, at Aspern and Essling in 1809, and in Silesia in 1813. In the first of these cases, a flood in the river Esla, which rendered it unfordable for twenty-four hours, was probably the salvation of Sir John Moore's army at the time; but the whole story of that campaign—the campaign of Corunna, which is an intensely interesting and instructive one, and one in which there are many incidents illustrative of the Fortune of War—I may perhaps have the honour of telling you on some other occasion later in the season, should opportunity offer.

I might also have given you, had time afforded, examples of the effect of sudden frosts, or sudden thaws, on the fortunes of an army. For instance, you would hardly believe perhaps that a fleet of ships could be captured by a charge of cavalry! Sir Evelyn Wood has not included the story, at all events, in his very interesting work, "The Achievements of Cavalry," which I cordially recommend you all to read. Yet it is a fact. It happened in 1794 when a French army under General Pichegru was engaged in the conquest of Holland. The winter of that year was the severest that had been known for a century past, and Alison writes: "To complete the wonders of this campaign, a body of cavalry, and flying artillery, crossed the Zuyder Zee on the ice, and summoned the Dutch fleet lying frozen up at the Texel. The commanders, confounded at the hardihood of the enterprise, surrendered their ships to this novel species of assailants!"

On the other hand, a sudden thaw has sometimes been as unfortunate for an army as a sudden frost. You have all no doubt read of the dreadful retreat from Moscow in the winter of 1812, and of the terrible sufferings of Napoleon's army amid

the Russian frosts and snows. These fearful horrors culminated when the Beresina was reached, an unfordable river across which the only bridge had been destroyed. "Never," said Napoleon, "was I placed in such a desperate situation. Pressed on all sides, I found my further progress barred by a river difficult to cross, and defended by an entire army. My task was, with soldiers half dead from cold and hunger, to conquer obstacles which would have terrified the best organised army. Fortune seemed to take pleasure in heaping horrors upon us during this fatal retreat. The severe cold which had come on just before we reached Smolensko had, about the time we quitted Krasnoi, yielded to a milder temperature, and the ice on the Beresina was broken up. This was a double misfortune. The Beresina, had it been frozen hard, would have permitted us to cross *en masse* and crush the army of Tchichagof: but on the contrary, filled with drifting blocks of ice, the construction of bridges was greatly impeded, and the floating masses, coming down with violence, endangered the bridges when established."

You see, therefore, that this was an occasion when an unexpected thaw was the most unfortunate thing that could have happened: and history teems with similar instances; but I have detained you already too long, and will therefore mention only one more, which shall be the last. It is an example of the winds and the waves fighting in our favour, as they have done on more than one fateful occasion.

In December 1796, the French sent an expedition to Ireland. It consisted of seventeen sail of the line, thirteen frigates, and numerous transports which carried some 25,000 men, destined to land in Bantry Bay, and co-operate with the Irish malcontents of the day, whose ardour, stimulated by the success of the French Revolution, led them to hope that the time was ripe for breaking off all connection with England, and setting up a Republic of their own on the model of France. However, from the moment of leaving harbour (Brest) nothing but disasters were encountered. Violent tempests prevailed throughout the time the ships were at sea. After losing one battleship and several transports, a battered remnant after eight days' struggling reached the appointed rendezvous: but amongst others, the frigate conveying General Hoche, the commander of the expedition, was driven off her course, and did not arrive at all. On board this frigate was not only the Commander-in-Chief, but also the field artillery of the expedition, and the treasure for its expenses. The 2nd-in-command, Admiral

Bouvet, did not, under the circumstances, venture to attempt a landing. He waited for some days, and then decided they should make the best of their way back to France. This they did eventually, but not without losing several more ships. Hoche himself, after escaping from a thousand perils, got back to France too : and that was the end of this expedition, of which it was said at the time that " The goodness of Providence to us has exhibited a second Armada," and of which it was written once more—" *Efflavit Deus, et dissipantur.*"

In conclusion, it only remains to ask if any useful lesson is to be learned from these experiences of the past ? I think we may answer " yes." And the lesson is that, recognising the fact that the future, where the operations of war are concerned, must always be full of " precious possibilities," it behoves each and all of us, in our respective stations, to fit ourselves by reading, by reflection, by observation, and by practical training of every kind that we can arrange, to take advantage of, and to profit by, the gifts of Fortune when she offers them to us ; and on the other hand, to endeavour to maintain ourselves bravely, and to try to do the thing that is right, when she averts her face, and the circumstances are adverse and difficult. To trust blindly in Fortune is of course as foolish a mistake as to ignore her existence altogether. " Fortune," said the great Emperor who trusted in the fickle goddess not a little, " Fortune is a woman. Avail yourself of her favour while she is in the humour, and beware that she does not change through resentment at your neglect." That I think is sound advice : avail yourself of her favours when she smiles, and do your best to conciliate her when she frowns : be prepared for either event : and remember always that—

" There is a tide in the affairs of men,
Which taken at the flood, leads on to fortune :
Omitted, all the voyage of life
Is bound in shallows and in miseries."

THE BEST METHOD OF RECRUITING THE INDIAN ARMIES.

BY LIEUTENANT W. K. SCHARLIEB, 5TH BENGAL CAVALRY.

"The best method of recruiting the Indian armies from sources not hitherto tapped, on the assumption that enlistment amongst the recognised martial races of the Indian Empire and its frontiers has been pushed very nearly to its utmost limits."

MOTTO :

"Whom do I over-censure? Whom do I over-praise? If there be something in them that looks very praiseworthy, that something I put to the test."

"Let good and able men discipline the people for seven years, and after that they may do to go to war."—The Confucian Analects.

Before proceeding with our subject it is necessary to define the exact meaning and scope of the theme for discussion. At first sight it would appear—firstly, "that enlistment amongst" *all* "recognised martial races has been pushed very nearly to its utmost limits;" and, secondly, that we are to confine our attentions to "sources not hitherto tapped" and "the best method of recruiting" from them. The assumption that *all* martial races are now fully exploited is, we must frankly admit, a little too sweeping, since there are many divisions of certain "recognised martial races," which are either inadequately or not at all represented in our ranks. These should, surely, be regarded as "sources not hitherto tapped" and accordingly be included in our review. In discussing untried races, we may presume that no considerable increase in our present numbers is to be looked for, and that, if new material is to be introduced, we must make room for it by reducing the numbers of some classes now in our ranks. This question is so intimately connected with that of army organization that the enlistment of no new class can be regarded as a matter by itself and apart from the whole, for which reason it will be impossible to avoid some reference to our present sources of supply, though we should make that reference as brief as possible.

Our Indian army is a mercenary army. History shows us that in a mercenary army homogeneity is a danger, and that the principle of dividing the interests of such a force by enlisting

Reasons for recruiting from every suitable source.

in it as many races as possible is a correct one.' The greater the number of races employed by us the wider the extension of our influence and the greater the spread of ideas of subordination and discipline. Moreover, if we make the demand on each source of supply something less than the supply forthcoming, we improve the quality and decrease the cost of that supply under ordinary circumstances, and render our army capable of considerable expansion, without a material alteration of character, should emergency demand the increase. For these and other reasons, while determining we will take none but good men, we must be careful to get them from as many classes as possible. We must decide first what classes we will enlist and, then, the extent to which we will employ them; in other words, the "caste composition" of the army as a whole.

The recruiting of the Indian army requires to be thoroughly systematized and carried out upon some well matured and comprehensive system. Recruiting in general. In recruiting from any particular class much must depend upon the purposes to which we may wish to put that class and its natural aptitude for the designed employment. The units,

Classification of units. battalions, or regiments of the Indian army may be considered under two headings—(i) "special troops" and (ii) "sub-divisional regiments." Under the former heading we may group pioneers, corps or divisional infantry, marines, native mountain batteries, sappers and miners, and the local forces of Burma. Under the latter all

Recruiting special those units, which will be included in the brigades and divisions of the armies of India. troops.

Of pioneers we shall require four battalions with the field army corps, and one or two more on the lines of communication. These should be drawn from three 3-battalion groups, composed of Sikhs, Tamils, and Hazaras. Of corps or divisional infantry we shall require at least two battalions with the field army corps, and, perhaps, one on the lines of communication. These should be drawn from one 4-battalion group, say the Corps of Guides. The ports of Bombay, Karachi, and Aden require that, in time of war, a certain force should be allocated for their defence and should not form part of our mobile organizations. One battalion of native infantry should be assigned to each; these battalions to be drawn from a 3-battalion group of marines, recruited from good classes—Panjabi Mahomedans, Pathans, and, perhaps, Arabs. The

¹ Colonel E. G. Barrow, No. 86, Volume XX, this Journal.

regiments in Burma are, strictly speaking, sub-divisional, but may more conveniently be classed as "special troops." The country of Burma, its inhabitants, their language, and their style of warfare demand special knowledge; in the east an European power is slowly, but surely, closing on us; and circumstances are conceivable under which a Chief Commissioner of Burma would have to repeat the part of John Lawrence in the Panjab of 1857, by sending every available armed man out of his province. The troops in Burma should, therefore, be (1) a local force, (2) recruited from the best fighting classes, and (3) suitable for general Imperial purposes. There is not, in all that country, one single native race, which, at present, fulfills these conditions, and we must, therefore, fall back upon those that do, upon Gurkhas, Panjabis, and Pathans. The pioneer regiments should recruit for themselves, and the Guides, marines, mountain batteries, sappers and miners, and Burma regiments through the recruiting officers of sub-divisional districts.

In the case of "sub-divisional regiments," having decided the classes to be enlisted by them, we may divide up the whole country, likely to supply us with good men of each class, into as many "company areas" as we may elect to enlist companies of that class in our sub-divisional regiments, and assign each area to a particular sub-divisional regiment.¹

The employment of natives of the country in preference to aliens must present advantages so obvious that it were waste of time to reproduce here the arguments in its favour. At the same time we must admit the expediency, if not the necessity, of employing certain classes of foreigners. The races to be included in the Indian army may therefore be considered under two headings—(1) extra-territorial and (2) intra-territorial.

Under the former we may group all those races whose homes are not readily accessible to the British recruiting officer. The best system we could employ would appear to be one similar to that now in force for the enlistment of Gurkhas. We may place under selected British officers certain conveniently situated "depôts" whence recruiting parties could be sent into the districts it is desired to exploit and where recruits, as

¹ See "Localization of Recruiting for the Infantry of the Native Army" by Captain A. A. J. Johnstone, No. 123, Volume XXV, this Journal.

they were brought in, could be collected, examined, and apportioned to the corps enlisting the class concerned.

In the case of intra-territorial classes, a varying number of "company areas" should be placed under a British recruiting officer. The men forthcoming from each company area should be permitted to elect for service either with the "sub-divisional regiment" to which their district belongs or with any of the "special troops" regiments enlisting men of their class. It will happen at first that "company areas" will be in some cases unequal, in others more than equal to the demand made upon them. The superfluities of the latter must make good the deficiencies of the former. It is not proposed that the caste composition of corps should be suddenly changed, but that regiments should gradually conform to an altered composition as their districts are developed. In course of time every company area should be equal to supplying considerably more men than we should require under ordinary circumstances.

In discussing the best system of recruiting, it is obvious that, with peoples differing so widely, it will be impossible to elaborate any one system of universal application, and that we must adopt in the case of each individual race such measures as a study of its origin, history, and characteristics may suggest. The proposed methods may be considered under two headings—(1) the "direct enlistment" and (2) the "tribal levy." Wild hill tribes to whom the slightest personal restriction is intolerable must, in the first instance, be employed in levies of the most irregular description. It is also necessary that any

class entertained in our regular army shall engage for general service—a condition which may at once prove a fatal objection in the case of many an untried race. The first step, therefore, must, as a rule, be the raising of *irregular tribal levies for local service*. In process of time a readiness to accept general service may display itself where least expected. Who among our officers, a century ago, would have anticipated the day, when even Hindus would welcome, with enthusiasm, the orders which would send them to fight our enemies across the "black waters" of the dreaded ocean. Having introduced the idea of military service to an untried race and habituated it to that idea, our chief difficulty will have been overcome. If, in the process of doing so, experience shall show the material

suitable, there should be no difficulty in extending our connection. In most, if not in all cases, the experiment must be entrusted to British officers, who should above all things possess that indefinable gift of commanding the confidence of savage peoples. We must be prepared to exercise the greatest patience, content to spend time, trouble and money, confident that perseverance will meet with its reward in due season. We must not be too eager to draw tight the bonds of discipline or make a "complete" soldier of a wild, independent, and generally dirty tribesman. When partisan soldiers are considered fit for conversion into regular sepoys, we must be careful, in accordance with the great principle of segregation, and, because we know orientals are sensitive and prejudiced to a degree, that their comrades shall be either men of their own class or of classes not particularly distasteful to them. One word of warning may be uttered here. Before we admit the claim of any untried race to the title "martial," let us be certain that the claim is clear. *Disappointment always and mischief often will result from conceiving too high an opinion of an untried people.*

The preceding pages on the "best method of recruiting" in general may be summarized as follows:—(1) Decide what races are to be enlisted; (2) the extent and nature of their employment; (3) divide the whole country inhabited by good men of each class into a certain number of recruiting districts under British officers; (4) in the case of extra-territorial classes, select suitably situated "depôts;" (5) intra-territorial classes to be exploited by British officers in person; (6) where possible, enlist direct; (7) where necessary, apply some preparatory process; and (8), until the system is in full operation, make good the deficiencies in new material from the superfluities of the old. It is claimed for this system that it will (1)

thoroughly exploit the country, (2) lighten the labours of recruiting officers and parties, (3) render it almost impossible for undesirable persons to enlist, (4) thoroughly systematize recruiting, and (5) do the utmost to foster the national and military spirit of every class in the army.

In accordance with the principle of employing natives in preference to aliens, in view of the fact that there is better material nearer to hand, and taking into consideration the cost of transport, no attempt will be made to discuss

Ottomans, Negroes,
Masai, Matabele,
Zulu, Swazi, Kafirs,
etc., Eurasians.

the suggestions, which have not infrequently been made, as to the employment of Turks (Osmanli) or Africans (Negroes, Masai, Matabele, Zulu, Swazi, and Kafirs). The question of enlisting Eurasians will also not be considered, as, although not foreign to the subject in hand, the matter has been fully dealt with elsewhere, and there appears to be nothing further to be urged in its favour.

PART I.

INDIA PROPER AND ITS FRONTIERS.

Border and Trans-Border Races of the North-West Frontier.

We may commence our review of "sources not hitherto tapped" and the best method of recruiting from each, with the races which inhabit the country between the Indus and the Oxus.

The border Pathan races differ greatly both morally and physically. As a whole they have been accused of being fanatical, turbulent, treacherous, and liable to panic, while, on the other hand, it is conceded that, as a rule, they are courageous and of excellent physique. Political expediency prompts the extension of our influence among these races, and experience has shown that, if enlisted with discrimination, they make good soldiers.

The following tribes may be considered good material, though some are better than others:—
 List of fighting tribes. Tanaolis (12,000),¹ Amazais (8,000),² Utmanzais (400), Bonerwals (8,000),⁴ Bajauris (30,000), Yusufzais (27,000),² Orakzais (24,880),⁵ Afridis (26,500), Buzotis (500),⁶ Sepahs (300),⁶ Zaimakhts (3,500),⁷ Bangashes (3,800),² Jagis, Khatmaks (27,000),² Marwats (13,300),² Niazis (9,070), Waziris (41,530), Shinwaris (12,000), Batanis (4,470), Turis (6,100),⁸ Shiranis (3,500), Baburs, Gundapuris, Ushteranis (900), Luni Pathans (2,500), Khutranis (3,200),⁹ Mandu Khels, Musa Khels (5,000), Isots (300), and the Kakar Afghans (a very numerous race).

¹ Figures in brackets number of fighting men taken from "Paget and Mason," where not otherwise stated. ² Calculated at $\frac{2}{3}$ of total population, Panjab Census Returns, 1891.—Tanaolis 57,730, Yusufzais 120,509, Bangashes 15,026, Khatmaks 120,180, Marwats 59,934, Niazis 40,800. ³ Lumsden 8,000, Bellew 2,000, Cox and Taylor 1,500. ⁴ Warburton 15,000, Captain Cardew 12,000. ⁵ Cardew 30,000. ⁶ Temple and Davies (1856) "Report on North-West Frontier tribes." ⁷ Temple classes this tribe as Afghans, and Davies (1864) estimates their fighting men at 5,000 foot and 400 "excellent horse." ⁸ Davies (1864) estimates their horsemen at 500. ⁹ Temple classes this tribe as Pathans, and estimates their fighting men at 3,000 foot and 200 horse.

Some of these tribes may be classed as "intra-territorial" and others as "extra-territorial," including under the latter heading all those whose homes could not be visited by British recruiting officers. We may apply to them both the "direct enlistment" and "tribal levy" systems of recruiting, and we may exploit each in accordance with the quantity and quality of material obtainable. The Afridi, Khattak, Orakzai, Bangash, and some Yusufzai clans already supply us with large numbers, and their increased entertainment is, perhaps, not advisable; indeed the numbers of Bangashes and Yusufzais now in our ranks might well be reduced. Zaimakhts, Turis, and Khutranis seem to show a natural aptitude for employment in the cavalry. Chalisis, Kohistanis, and the Dalzac, Dard, and Tartar tribes of the Kashmir border have not been alluded to, as their exploitation might more appropriately be undertaken by the Kashmir than by the Indian army.

According to the Panjab Census (1891) Returns, there were 416,611 Baluchis in British territory alone, and as the proportion of that number in our ranks does not amount to '3 per cent., we may regard this people as a particularly untapped source. The Baluch is spare and wiry, not turbulent, treacherous, nor fanatical; he is courageous, enduring, and truthful, a great horse-breeder and an expert rider. The Brahuīs, who, though said to be distinct from the Baluchis, intermarry freely with them and partake of their general characteristics, may conveniently be classed with them. A levy of some 12 companies raised through selected Tomanders and located at suitable places would in time result in as many class companies. We should meanwhile increase the number of Baluch and Brahuī companies in our ranks.¹

Afghan races and Giljis, who together number nearly a million souls,² inhabit the kingdom of Kabul proper. Both are physically magnificent races of good courage, but it is perhaps neither expedient nor feasible to recruit very largely from them. There are already three companies of Giljis in our service; a like number of Duranis might be maintained,³ both recruited as far as possible from British territory.

¹ Of Turki origin, Bellew, "Races of Afghanistan." ² Malleeson (1885) says 900,000. ³ By direct enlistment.

Living in Kabul itself is a community of Persians numbering some 60,000 souls,¹ who have received the Turki name of "Qizzilbash."

They were settled in Kabul, as a military colony, by Nadir Shah in 1736 and have continued to flourish ever since. They are fine men of good courage, free from the vices of the Afghan, and very well disposed towards the British, to whom they have rendered important services upon occasions. They

may, therefore, be considered a very desirable class. A few have settled in British territory,² from whom a commencement might be made.³

The Hazaras differ entirely from the other races of Afghanistan. Their country is practically unknown to Europeans. There can be no

doubt that they are Tartars of the Mongolian division, but little is known of their history, and they seem to have no traditions among themselves. They acknowledge the Char Aymac, Jamshedi, Firozkohi, Tymuni, and other Tartar tribes of the western part of the country as kindred, but have no very intimate relations with them. They are said to be simple, entirely illiterate, very poor, and hardy, and amongst their neighbours have the reputation of being honest, industrious, intelligent, and very brave. As a rule, they are irreconcilably hostile to the Afghans and have always shown a good disposition towards us. They are of the same race as and in physiognomy and in warlike characteristics very strongly resemble the Gurkhas, whom, however, they excel in physique. Of their numbers nothing is known for certain, though they are roughly reckoned at 120,000 houses.⁴ They hold a position on the flanks of the routes from Kabul and from Kandahar to Herat. What their assistance or opposition would mean to a force moving by those routes, or to any power in occupation of Afghanistan, may be left to the imagination. There is some reason to hope they would make as good soldiers as Gurkhas, and they would be "a reliable counterpoise to the increasing Pathan element in our army."⁵ There are at present only three compa-

nies in our service—a number which might well be largely increased. The Hazaras, however, display no eagerness for military service, but "every man has his price," and the Hazaras probably have theirs.

¹ Malleon (1885). ² Panjab Census (1891) Returns—1038, Dranis, 28,081 Giljis, and 747 Qizzilbashes. ³ By direct enlistment. ⁴ Bellew; Malleon (1885) 200,000 persons. ⁵ Colonel E. G. Barrow.

If the existing companies were collected in a pioneer battalion located in the Quetta district and put in the way of earning working pay, Hazaras would probably enlist freely.

The Tajiks inhabit the Herat Valley and number somewhat

Tajiks. over a million souls.¹ They are Persians with an admixture of Arab blood.² They

are a handsome people, tall, robust, peaceable, industrious, and frugal. They are subordinate to the Afghans, have no voice in the government of the country and rarely take military service, but for all that they make good soldiers, and, being well disposed towards us, should be welcomed to our ranks if we can tempt them to enlist. There are a few³ representatives of the race

Recruiting. in British territory, from whom a company or two could be raised by way of enhancing

the attractions of our service in the eyes of the Herati. The experiment should not, however, be considered hopeful, though it is worth trying.

The Turkomans of Afghanistan probably number about a million.⁴ They are of the same race as

Turkis. the Turkomans, who, under Nur Verdi Khan,

defeated the Russian expeditions of 1877, 1878, and 1879. They appear to be well disposed to the British, but have not always shown themselves the most loyal of subjects to our right faithful ally the Amir of Afghanistan. Their homes are somewhat

Recruiting. remote and the experiment of enlisting them may be regarded in the same light

and carried out in the same way as suggested in the case of the Tajiks.⁵

The Kafir and his Mahomedan brother, the Safi, are undesirable classes.
Kafirs, Safis.

The employment of Arabs in the Indian army has been suggested by various writers, but the fact

Arabs. that the Arab is a foreigner and that equally

good material exists nearer to hand has been hitherto considered a fatal objection. When, however, we come to consider the cases of battalions maintained for service at Aden, Kurrachi, and Bombay, the suggestion acquires new force. A glance at a map will show us that at Aden the Arab becomes a native, and that at Kurrachi and Bombay he is no more a foreigner than the Pathans, Panjabis, and Hindustanis of the

¹ Malleeson (1885) says 1,170,000. ² Bellew; Malleeson substitutes Turki for Arab. ³ Panjab Census (1891) Returns—1,993 Tajiks. ⁴ Malleeson (1885)—population Afghan Turkestan 1,224,000—say people almost entirely Turki. ⁵ Panjab Census (1891) Returns—6,069 Turkis.

Bombay army. The ports mentioned must be held by good troops, and we must admit the fighting qualities of Arabs and Soudanis. A stretch of something like 10,000 miles of coast

Soudanis. from Zanzibar to Bander Abbas, up both shores of the Gulf of Aden, the Red Sea, and the Persian Gulf, is inhabited by Arabs, who, in some cases, stretch far inland. The reconquest of the Soudan will also make much excellent material available. The question of employing Abyssinians is also not altogether unworthy of notice. The Abyssinian is a fine fighting

Abyssinians. man, accustomed to discipline, and a *Christian*.¹ He is often an accomplished horseman and might well be enlisted in the "Aden troop." It is not, however, expedient that any extra expense should be incurred in the enlistment of any of these classes. Warships proceeding

Recruiting. to or from Aden, Kurrachi, and Bombay could drop or pick up parties recruiting Arabs at such places as lie on their course. Arabs and Abyssinians could also be enlisted direct at Aden and Bombay. Soudanis should be obtained through the Egyptian army and enrolled at Aden or Bombay.

India Proper.

The "hitherto untapped sources" of India proper have already been frequently and more or less fully treated by a variety of writers of merit, but very brief notice here.

The term "Panjabi Mahomedan" includes clans, some of whom are fully, perhaps too fully, exploited, Panjabis. while others are more or less neglected. "Panjabi Hindus"—Brahmans (1,102,539),² Rajputs (403,231),³ and Jats (1,732,461)⁴—are practically unrepresented in our ranks. Of the new material in the Panjab not all is good, but there are Mahomedan clans at present neglected which could supply us with better men than some Panjabi Mahomedans now in our ranks, while the Hindu classes mentioned are in most districts as good as they are in Hindustan. In the Bengal and Bombay armies there are 16 companies of Brahmans, 42 of Jats, and 96 of Rajputs, we might well increase these numbers by gradually converting a certain number of companies in the Hyderabad Contingent, recruiting the whole from company areas in the Panjab, Hindustan, and Rajputana by direct enlistment.

¹ See "The Abyssinian Army," Colonel G. A. Furse, No. 143, R. U. S. Journal. ² Panjab Census Returns, 1891.

Of new material in the Hindustan area we need only refer to Mahomedans—(1) Sheikhs, Sadiq, and Sayeds, (2) Moghals, (3) Pathans, (4) Ranghars, and (5) others. To mix in the same company men of these different classes is to throw away all the benefits to be derived from an appeal to pride of race, to neglect much we might do to foster a national and military spirit and to give them a community of interests they could not otherwise possess. When we consider their traditions of empire and military success, we may be sure that class companies or battalions of Moghals would be second to none in *esprit de corps*. Hindustani Pathans may be said to include those classes of the Eastern Panjab and Hindustan which are of Pathan extraction. To return them as Pathans is to invite confusion, but they are proud of their origin, and an appropriate name is to be found in the word "Rohilla," which will also include the once turbulent and warlike people of that name, who may be regarded as an untapped source of no little merit. Ranghars, as infantry men, constitute new and excellent material, but their pride of race and intense clannishness render it necessary to accustom them gradually to the authority of men of race other than their own. We should obtain the native commissioned and non-commissioned officers for one or two companies by offering a step in rank to smart cavalry men of this class. The superior ranks once obtained recruits could be readily enlisted, and a beginning once made their restiveness under men of other races would gradually disappear. Other Hindustani Mahomedans consist principally of Sheikhs converted to the faith, and should not, as a rule, be admitted to our ranks.

New material in the Southern Presidencies is to be found in the Mapilahs, Nairs, and Coorgs, the question of whose employment has been before the authorities for some time. The enlistment of Mapilahs is now being experimented with in the 25th Madras Infantry, and as definite conclusions regarding the others must have been arrived at, these races need not be discussed.

There remain the Himalayan races—Garhwalis, Kumaonis, Gurkhas, Leptias, and Butias.¹

Kumaonis, Leptias (Sikkim), and Butias are classes from whom very few good men are to be obtained.

The Garhwali country is divided into eleven pergunnahs and independent Garhwal. The 39th Bengal Infantry is recruited from s.x of the

¹ A people called Butia exist in Garhwal: they are equally undesirable.

pergunnahs. A second battalion might possibly be maintained if outside recruiting were completely stopped.

In ancient times Nipal was inhabited by Dotis, Maggars, Gurkhas, Gurungs, Rais, Limbus, Niwars, and Murmis,* all of whom were Tartar by origin and Shamanists by religion.

In the twelfth century numbers of Hindus, mostly Brahmans and Rajputs, fugitives from Mahomedan conquest and oppression, began to take refuge among the savage Maggar tribesmen, by whom they were kindly received and among whom their superior intelligence and civilization secured for them positions of influence and importance.*¹ The Brahmans found the natives illiterate but proud, ready to receive their doctrines, but not apt to stoop to degradation, and they acted accordingly. To the earliest and most distinguished of their converts, they communicated, in defiance of the creed they taught, the lofty rank and honors of the Kshatriya order. But the Hindus had sensual passions to gratify. They found the native females nothing loth, but still of a temper to resent indignities,² and on the progeny of their intercourse they conferred the patronymics of their fathers. Thus we arrive at two new classes, the Brahman and the Kshatriya, both of Hindu-Maggar origin, from whom Hinduism has gradually spread until now, all the races of Nipal are actually or nominally Hindus.

In the latter half of the last century the Sahi Thakur chiefs of the principality of Gurkha extended their dominion over the whole of modern Nipal, whence the term applied by us to all the races inhabiting that country. The tribes, which, as possessing high military qualities, concern us here are Brahmans, Kshatriyas,³ Maggars, Gurungs, Niwars, Rais, and Limbus.

The 1st to 5th Gurkha regiments and the 42nd, 43rd Bengal Infantry are recruited almost entirely from Maggars and Gurungs, the 9th Bengal Infantry entirely and the 44th Bengal Infantry largely from Kshatriya castes. It appears that, while a Gurkha battalion stationed in India needs but 50 recruits per annum, a battalion quartered in Assam requires 120 recruits in the same time. With the annexation

* Captain Vansittart's "Notes on Gurkhas."

¹ The author "The Sepoy Officer's Manual" calls these immigrants "conquerors." ² Precid from Brian Hodgson. ³ Includes Khas, Thakurs, and others of Kshatriya rank.

of Burma the object of maintaining regular troops in Assam ceases to exist. The ideal force for the country is a military police organized and trained for guerilla warfare. If the twelve battalions recruiting Maggars and Gurungs were *all* quartered in India, they would require only 600 recruits per annum, which would give them the pick of 75 per cent. of recruits, while the 25 per cent. surplus, if assigned to the Assam Military Police, would provide them with a much needed reserve in times of emergency.

It is a generally received idea that Khas and Thakurs are somewhat and that Rais and Limbus are considerably inferior as soldiers to Maggars and Gurungs. The old Mogoung Levy and its present representatives the Mogoung and Myitkyina battalions of Burma Military Police have a record of a decade's service in the Kachin Hills, they comprise about sixteen companies of Gurkhas enlisted from almost every class, the officers have always taken the keenest interest in the men, they have had every opportunity of forming an opinion on the respective merits of the various classes, and the conclusion they have come to is that neither is one before nor after another in point of courage.

The *Brahman* and *Kshatriya* classes are taller, slighter more intelligent, less Mongolian looking and less liable to malaria than Matwalias, perhaps because they are more temperate and live, as a rule, at lower altitudes. They have too much influence over the others and their caste prejudices make them a nuisance in the lines, but they are always to the fore in a fight and never give trouble on service. *Maggars* and *Gurungs* of Eastern Nipal are somewhat inferior to those of the central districts, but make good soldiers. *Sunwars* are mostly of good physique and well behaved, but are not obtainable in large numbers. *Limbus* and *Rais* are very closely allied by race and intermarry freely. Both are being more extensively enlisted in the Nipal army. The Limbus are a smart, well behaved, level people, in all round military value—*second to none*. The Rais present a great variety of types of physique; they are confirmed gamblers, inclined to be dirty, slack, and very quarrelsome. In their own country out come their kukhris on the slightest provocation; they should be enlisted with discrimination and require a tight hand over them; but in the field they are brave, hardworking, and give no trouble. *Lamas*: the Nipal army enlists Thamangs only as sepoy and the Dakpas and Syarpas as gun-porters. Lamas are of fine physique, but are inclined to

be dirty and unruly. Niwars are, as a rule, brave and intelligent, but they are of poorer physique than others (best clan Shirist). *Damaïs*, *Sarkis*, and *Lohars* should be enlisted only as artisans : one man of each class in each company would be of great use as tailor, shoemaker, and smith, respectively. *Kochias*, *Mechias*, and *Denwars* are found in the Saptari, Mahatari, and Sartahi districts of Nipal, whence about 500 could be obtained. They are fine men and, Gurkhas say, would make good soldiers, and as they have lived for generations in lowlying jungle country, *they are proof against fever!* Sunwars, Lamas, Limbus, and Rais are much less under Brahmanical influence than Maggars. Nipal is becoming overpopulated, especially in the east, where the land is all under cultivation and the jungle almost entirely cleared ; as a result the people will probably deteriorate in physique and as jungle fighters. Gurkhas, as soldiers or *colonists*, should be obtainable in ever-increasing numbers.

The Kshatriya classes are equal to completing the 9th and 44th Bengal Infantry, and the Rais and Limbus to completing two other battalions. In addition these classes, with the surplus Maggars and Gurungs referred to, and the other classes mentioned, are not only quite equal to meeting the present needs of the Assam and Burma Military Police, but also the extra requirements of the former consequent upon the withdrawal of regular troops from the province.* The best method of recruiting the new classes is that now in force, with this exception in the cases of those enlisted both by regulars and military police, the former should have the pick of the recruits forthcoming.

PART II.

FURTHER INDIA OR-INDO-CHINA.

Assam and Further India may conveniently be considered together. The physical features of the countries, the climatic conditions, and styles of warfare are practically identical and the native races are mostly of cognate origin. The forces employed in those regions are of two descriptions—regulars and military police. The latter is, of course, a civil institution, but it is almost entirely recruited from the same sources as the Indian army and to a large extent from those “recognized martial races” amongst whom “enlistment has been pushed

Local forces, regulars, and military police.

* The enlistment of Gurkhas in the armies of Native States (Kashmir, Rampur, etc.) should be stopped.

very nearly to its utmost limits,"¹ it has, therefore, too important an effect on recruiting in general to be ignored here.

The questions of lessening the strain upon the Panjabi classes and the substitution of natives for aliens are recognized as being of the greatest importance. The first is a problem whose solution is, perhaps, not as difficult as it appears. In recruiting from any particular class, our officers have, as a rule, only one idea before them, and that is, to enlist the "finest"

Riflemen.

(i.e., the biggest and tallest) men of that class, regardless of the suitability of the big man for the theatre of his employment. The ideal man for a jungle country, if not for any country, is from 5 feet 1 to 5 feet 7 or 8 inches in height, with a minimum chest measurement of 32 or 33 inches, and the sturdier the better. There are hundreds, nay thousands, of good Pathans, Panjabis, and Hindustanis of this description who would not be enlisted by any regiment in India.

With regard to the employment of native races, it has been said that not one of them can, *as yet*, be considered fit for admission to the ranks of our regular army, but this does not apply to the military police. The rôle of any police force, civil or military, is not primarily, if at all, defence against foreign aggression, but the preservation of internal quiet. Whatever the fighting value of the native races may be, we may safely assume that suitably trained, organized, and equipped and lead by British officers, they will be quite equal to dealing with their civilian compatriots. The obstacle to their employment is not their unsuitability, but the difficulty of rendering them trustworthy and submissive to the necessary training and discipline. We may confidently anticipate that the obstacle will not prove insurmountable, and we may hope, too, that experience will show the material worthy of admission to the ranks of our regular army. In the case of the untried native races of Indo-China, we may regard the military police of Assam and Burma as a preparatory school for the regular army.

The Mons and Burmese of to-day are so alike that they may be regarded here as one people. They are a

Burmese.

light-hearted race, rejoicing in spectacles, and given to pleasure. They are free from caste prejudices, and the men are, as a rule, short, thickset, and of good muscular development. But they are superlatively lazy, apathetic, very unbusiness like, utterly lacking in any sense of order or duty and

¹ See table.

the capacity for sustained effort. They find the restraints of discipline intolerable, they are so sensitive that a light reproof will often cause a man to resign a good appointment, and *their courage is open to doubt*. It is fair to say that the Burman has been tried as a soldier not altogether without success. Major Fytche, when Deputy Commissioner of Bassein,¹ raised a military police from dacoits and other bad characters. Discipline was, however, only maintained by resort to extreme measures and the men required the constant supervision of European officers. They certainly dispersed the marauding gangs in the district and suppressed the local rebellion of 1854 and the Karen rebellion of 1856. But the enemy was an armed mob under civilian leaders without discipline or coherence and either Burmans like themselves or Karens of the plains. There are also the cases of the old Pegu Light Infantry and the experiment of enlisting Burmese in the present military police when first raised, and though in neither instance was the trial quite a fair one, we should have little hesitation in deciding that the Burman has little claim to the title "martial" and

Recruiting. will never make a good soldier. Should it, however, be decided to give the Burman a trial, it should be by direct enlistment in class companies and in the military police.

The Shans are, as a rule, of finer physique than the Burmese, they are equally free from caste prejudice and they are very painstaking, hardworking, thrifty, frugal, law-abiding, and submissive; they are, in fact, good subjects and an ideal peasantry, but, with the possible exception of the Mainthas, their courage is open to doubt. (Recruiting same as for Burmese.)

Recruiting. The Karens, though of the same stock, differ considerably from the Mons, Burmese, and Shans, and are probably nearly akin to the Chins, Kachins, and the tribes of Assam, whom they so closely resemble in appearance, habits, traditions, language, and religion, that much that can be said of any one of them might be said of them all. The physical and moral characteristics of Karens, their traditions and their customs harmonize with linguistic evidence in assigning their origin to middle Asia. It is evident that the Karens, in common with other Indo-Chinese

¹ Fytche's "Burma Past and Present."

races, belong to that family of nations commonly described as **Tartar**, which, during the decline of the Roman Empire, began permanently to forsake their homes in the great plateau of Central Asia and pouring across Europe, Persia, India, and China, established for a time the most formidable empire known to history, whose terror and fame under the appellation of Huns, Moghals, and Manchus extended to the frontiers of Italy, the highlands of Central India, and the shores of the Western Pacific. The Karens are divided in three tribes and the tribes into several clans—*vis.*, **PWO** (*Pwo, Pie-do, Kuhto, and Shoung*); **SGAU** (*Sagu, Manupgha, Paku, and We-wa*); and **BGAI** or **BWE** (*Bghai-ka-htu, Bghai-ka-tum, Mopgha, Gèkhu, Tsawkhu, Padoung, Bre, Ma-ne-ma-naw, Karen-ni, Yindlin, Taru, Hashwi, etc.*). The *Pwo* and *Sgau* clans only inhabit the plains; the former mainly about Moulmein and the latter in the Pegu Yomas. They suffered considerably from Burmese oppression and are contemptible soldiers in comparison with their highland congeners, whom, however, they generally excel in physique. The highland clans are found in the Toungoo Hill Tracts, the Southern Shan States, and round about Zimme (Cheng-mai) in Siam. They not only differ somewhat from the plainsmen, but differ considerably from one another. The *Karen-ni*, or red Karens, are darker than other Karens and are perhaps also superior in natural endowments; they are taller, more upright in form, and more elegantly proportioned; they are more impulsive and therefore less apathetic, but they are faithless, licentious, and drunken, unrelentingly cruel and fierce, careless of human life and suffering, and are distinguished for their savage, intractable, turbulent, and undisciplined character. The *Tsawkus* are darker and less Mongolian than most Karens. They are wiry, well set up, and straight limbed, but they are inhospitable and quarrelsome. The *Gèkhus* are tall and stout for Karens. They are muscular, daring, adventurous, and warlike. They are fairer and claim to be superior to other Karens. The *Padoungs* and *Hashwis* resemble the *Gèkhus*, while the *Bres* are more like the *Tsawkhus*. The *Toungthus* are not classed as Karens by some authorities, and Captain Foley says (Journ. Ind. Arch. No. 4 of 1857) "I am persuaded that these people are descendents of the *Tanjau* described by Gibbon, a *remnant of the ancient Huns*!"* Differing as the various tribes do, they

* Quoted by Fytche and by McMahon ("The Karens of the Golden Chersonese"). The former seems not only to credit the statement, but to believe the same origin possible for all Karens.

have many points in common, which allow us to speak of them as a homogeneous whole. As a race they are drunken, filthy, untruthful, and indolent, incapable of sustained effort, fierce, turbulent, and undisciplined. In manner they are quiet, grave, and undemonstrative, and conceal their emotions; they are very matter-of-fact, practical, and devoid of humour. They have no prejudices and no particular tastes, except for music. They know nothing, but *acquire knowledge quickly*. They originate nothing, but are *apt imitators*. The uneducated Karen presents an example of hopeless stupidity, owing partly to his nervous and suspicious nature, which prompts him to affect ignorance as the easiest way to evade inquiry, or avoid compromising himself. His religion is that naturalism, which is the religion of the Kachins, Chins, and the aboriginal tribes of China that worship of the "*äü loci*," which was the religion of the Tartars. The history of religion teaches us that many rude and uncultured races, whose only worship consists in the adoration of the principal objects of nature, present, as it were, a virgin soil in which the seed of new ideas takes root and fructifies. Karen traditions taught them to look to the west—to white foreigners, who were to come by the ocean, bringing with them the Book, once theirs, which was to make them acquainted with the true God. The advent of the English was accordingly hailed with delight. The Karens had in addition stories of the fall of man, the deluge, the confusion of tongues, and the dispersion of nations, more or less resembling the Biblical accounts of the same events. The rapid advance of Christianity among Karens is, therefore, not a matter for much surprise, but the effects of Christianity upon their moral character is absolutely astonishing. The missionaries found the Karens engaged in internecine wars, and sunk in the state of savagery already described. Where the Gospel has spread such things no longer prevail. The missionaries have succeeded in weaning the Karen from his debased habits; they have turned drunken, indolent, and turbulent savages into sober, earnest, and law-abiding citizens, and have implanted in their minds a healthy sense of responsibility. The Chief Commissioner of Burma in a minute of the 1st of May 1863 writes: "I assert from long experience that such results could not be obtained by the civil administration unaided by missionary teaching." The value of missionary labors from a military point of view can scarcely be over-estimated, for the Karens

¹ Quoted by McMahon.

promise to provide us, ere long, with a native material for the ranks of our regular army. For some years past they have been employed in the military police, during which time they have been tried under service conditions once only in the Sima operations of January 1893. The experiment seemed to show that, though the Karen was not wanting in courage, he was so utterly lacking in discipline that there was little promise, if any, that he would ever make a soldier. But the Karen has been in good hands since then; he appears to have been rendered thoroughly amenable to military discipline and to have been practically cured of his tendency to desert.* It only remains to be shown that he can be induced to serve away from his home and the Karen may be considered almost ready for the final trial. Of the Karens in the military police, 608 belong to the Karen Battalion, Toungoo. The Karen outposts should be taken over by detachments from other battalions and the Karens should be got together in some suitable place and have at least three British officers attached to them to thoroughly prepare them for the final ordeal. They should be given the first suitable opportunity of proving their worth *under the officers they have been accustomed to serve with*. Let the trial be a fair one and, as far as possible, final. Some time may elapse before a suitable opportunity occurs. In the meantime a few new companies should be raised, for there can be little doubt that be the military value of the Karens what it may, they are more suitable for employment in the military police than some hundreds of Indians now in its ranks.

Karen recruits should, as a rule, be from 5 feet to 5 feet 5 inches in height, with a minimum chest measurement of 32 inches. The best recruits come from the *Gèkhus*, *Tsawkhus*, *Padoungs*, *Karen-ni*, and *Northern Bres*, but the last named are given to desertion. Recruits are to be obtained at all seasons of the year, but most readily just after the sowing and just after the reaping of the crops, when recruiting parties should be sent out under selected non-commissioned officers furnished with letters of recommendation to the elders of the districts to be visited. This last measure enlists the sympathy and co-operation of the elders and their influence goes for much.

Should the Karen prove all that his admirers believe him to be, what a vista of almost boundless possibilities opens before us! The Karen has for all but Europeans a quiet

* Karens desert only from Toungoo, which is near their homes.

contempt, born of sincere conviction in his own superiority. He regards himself as a European, and as there is not wanting authority for his aspirations, we should encourage the idea that he has nothing in common with other Asiatics and much in common with us. His religion is another and, at present, a stronger tie. Teach him, as a soldier, that our interests are his interests, no less than our religion in his religion. If the Karen has the qualities latent in him, what we may make of him depends entirely upon his officers. His position with regard to the Englishman is exactly that of the small boy who accepts a big brother as a pattern in everything. If the big brother is only equal to the part, if by sympathy and moral worth he can at once tacitly admit the relationship and maintain the degree thereof, there is little limit to either the devotion he could inspire or the self-sacrifice he could command. There is little fear that the Karen would outgrow the tutelage, for, though quick to learn and apt to imitate, he can originate nothing. The position is not without its difficulties, since it is that of a man who is put on a pedestal and has to maintain himself there. But the educated English gentleman should have little difficulty in maintaining his ascendancy over the simple and credulous Karen. The Karen has, however, much of the earnestness of the newly and sincerely converted and has his own ideas on certain subjects, *verb sap* !

The Kachin country may be briefly described as the basin of the Upper Irrawaddy. Among the Kachins
 Kachins.* are to be found a few Shans and Shan-Burmans in the south and Yawyins or Lishaws on the Chinese frontier.¹ The tribes which concern us here are the five true "Chingpaw" tribes—the *Marans*, *Marips*, *Lepais*, *Lah-tawngs*, and the *'Nkhums*. The seven "allied" tribes—the *'NTing*, *Nang*, *'NJanmaja*, *Makawng-Liang*, *Karyeng*, *Malang*, and *Paukkhyeng*, and the "cognate" tribes, of which the only noteworthy are the *Sássans*, *Marus*, and *Lashis*. The "Chingpaw," "allied," and "cognate" tribes may conveniently be considered together. They differ both in physical and moral characteristics and sometimes in language and customs, but not in religion, nor probably in origin.² As a rule the Kachin is a

* Kachin (often spelt Kahhyen) is the Burmese name for this people. They call themselves Chingpaw (spelt Singpho in Assam). Khaku is the name applied by Kachins to their brethren living higher up-stream and is derived from the Chingpaw words *Kha* a river and *Khu* a hole and means river-source, i.e., up-river.

¹ These merit no further mention. ² The Marus and Lashis claim to be akin, to be distinct from the others, and to have come from China.

short,' thick-set man, with long arms and body and short powerful legs and strongly marked Mongolian type of features. The Kachin is a dirty, drunken, savage, quarrelsome in his cups and almost always an opium-eater, but he is proud, sensitive, and fairly truthful. He is ignorant, but intelligent, utterly improvident and very lazy, but capable of great exertion when he chooses. His tactics consist of ambuscades and night surprises, but he is not treacherous and he is addicted to cattle-lifting and the levying of black-mail, but he is no petty pilferer. The only check on the liberty of the Kachin is the fear of the *nats*¹ and the disinclination of incurring another blood feud, since no injury, however small, or however unintentionally caused, may be passed over. In all our numerous collisions with the Kachins, we have usually employed none but the best native soldiers, Gurkhas, Panjabis, and Pathans, lead by officers from Gurkha and Panjab regiments, who were of the opinion that their followers were neither unfavorable specimens of their classes nor wanting in courage, yet our "columns" had sometimes to retire without effecting their objects and they invariably lost far more heavily than the enemy. It is true that the Panjabis were very much out of their element and that the Kachins are better jungle men even than our Gurkhas, but it is also true that our troops were armed with breech-loaders, that they were trained, disciplined, organized, and lead by British officers, and that the Kachins had only old flint locks and had no training, no discipline, no coherence, and no leading. Our troops were for a time in a critical position at Sadon in 1892 and at Sima in 1893. The fighting at the latter place was as severe, if not severer, than any other in Burma: our column consisted of 600 Gurkhas under six British officers. Our losses, especially in officers, were very heavy, yet the Kachins certainly never out-numbered us by as much as two to one, and we probably had more men in the field than they had before we could crush them. Yet officers are not wanting who will deny that the Kachin has courage, on the sole grounds that he never met us in open fight. Under the conditions which obtained for the Kachins, their style of warfare was the best conceivable. To expect a people to abandon tactics, which the experience of decades of internecine warfare has taught them to adopt, in deference to our notions of chivalry, of the existence which

¹ Average height 5 feet 4 inches. ² The "*Genü Loci*" mostly malignant, neither worshipped nor liked, but propitiated by Kachins.

they were absolutely ignorant, seems the height of absurdity, and to brand them as cowards, the height of injustice. Even if there were not wanting officers of experience to testify to the Kachin's courage, facts speak in clear and convincing accents. He has courage, of what order remains to be seen: it is at all events enough for our present purposes. The Kachin is an admirable jungle man. He has intelligence and endurance, his wants are few, he can work hard, he will eat almost anything, and he is absolutely free from anything like caste prejudice.

With the exception of a few "*Kumlaos*," commonly called republicans, Kachins are all under various Duwas, or hereditary chiefs. Our Political Officers may be called upon to select

Recruiting.

certain Duwas whom we might engage to maintain in certain places, a certain number of armed followers, in return for a certain monthly subsidy, not demanding at first the constant presence of the same individuals, but of a fixed number. To them might be relegated the duties of garrisoning small and unhealthy posts, of providing all escorts, except those over-treasure, arms, and ammunition, of clearing and repairing the roads, of acquiring information, of repairing and constructing posts and bridges, and of clearing jungle. To each contracting *Duwa* should be served out a certain number of Kachin jackets of uniform pattern and perhaps also leather belts, as signs of authority and office, and cheap Shan trousers. The question of arms is a serious one. To arm the Kachin with the enfield is to provide him with a weapon for which he can always obtain as much ammunition as he wishes. In the case of a *rifle* we could no doubt control the supply of ammunition to a considerable extent, but upon one excuse or another the Kachin might in time collect a dangerous amount. He might also sell his rifle to the Chinese and betake himself across the border. Incomparably the best course would apparently be to let the Kachin arm himself; he would very soon get a gun or tell us who had one which would suit him. By this means we should avoid increasing the number of fire-arms in the country and should obtain some knowledge of their number and quality. That the Kachin should carry his dah as a matter of course; when the time comes a slight alteration in the handle and the shape of the blade will turn the dah into a very serviceable bayonet. The influence of a Duwa depends considerably on the character of the individual; the attitude of his followers being that they would rather obey him than not. The greater the

influence of the Duwas, the easier it is for our Political Officers to control the tribesmen, and anything tending to increase the authority and importance of these chiefs must be a distinct political gain. To subsidise a ruling Duwa and make him the paymaster of his men and responsible for the peace of his district would surely tend to increase his authority, while we should always hold over his head the loss of subsidy and privileges as a punishment for shortcomings. It would not be feasible or expedient to place these little levies under the direct control of military officers until they become susceptible of organization by companies and ready to acquire a little discipline and drill. Meanwhile they should, in most cases, be under the direct control of the Political Officers of various districts, who might, perhaps, be assisted and advised on military matters by a selected officer who would "travel about and have a look-out at"—*not inspect*—the several levies. We may trust that contact with the Gurkha will lead to imitation and imitation to emulation: when that comes to pass our experiment will be on the high road to success.

Authorities are divided as to the exact degree of relationship existing between the various races inhabiting the watershed between the Brahmaputra and the Irrawaddy. But we may reasonably accept the theory that the Chins are a Kuki tribe, that the Kukis and Lushais are closely allied, and that the Nagas are a separate people, though of cognate origin. The Chins have, however, so completely forgotten their Kuki origin and have become so entirely a separate political entity that they may be considered apart.

The Chin country is a broken and contorted mass of mountains, intersected by deep, narrow valleys and is utterly devoid of plains or tablelands. The Chins number about 90,000 persons, of whom 24,000 men are fit to bear arms. They are divided into seven main tribes, each of which believes itself to be a distinct people. It is evident, however, that all belong to one and the same, the Kuki race, which, owing to the want of a written language and to internecine warfare, has split up and resulted in a Babel of tongues, a variety of customs and a diversity of modes of living. The appearance of the tribesmen differs as widely as their language. But throughout the vast apparent differences in detail the main Kuki characteristics can be universally traced. The slow speech, serious manner, respect for birth, the duty of revenge, the method of warfare, the vices of drunkenness, avarice, mendacity

and theft, the filth, distrust, and impatience of control, the virtue of hospitality, the clannish feeling, the incapacity for combination or continued effort, the arrogance in victory and discouragement and panic in defeat. With regard to the individual tribes the *Haka* is distinguished for his manly carriage, his frank self-assured manners, his regular features, and his avarice. The *Siyin* has a short flat nose, small keen bright eyes, and enormous legs, he is stealthy and cat-like in all his movements, he is evil-looking, cruel, and treacherous, and is a thief and a liar above all Chins. The *Tashon* is remarkable for his business qualities, his shrewdness, diplomacy, and love of intrigue. The other tribes are the *Whenohs*, who are Lushais, pure and simple, the *Thados*, *Sokts*, and *Nwengals*.

With regard to the value of Chins as soldiers we may first discuss that *sine quâ non* of all soldiers, *viz.*, courage. Messrs. Carey and Tucker, the authors of "The Chin Hills," record it as their opinion that "the Chin will not willingly risk his life more than he can help. Although we have all admired Siyins at various times who have carried off their wounded comrades in the most plucky manner and who have crept into camp singly or in pairs and stolen and killed in our very midst, yet as a race Chins are not courageous. They are always dangerous when taking the offensive, but lose heart when acting on the defensive." These are somewhat contradictory terms, though the statement that the Chins are *not* courageous is clear enough. At the same time these gentlemen record the fact that, when we first advanced into the hills, the Chins fought in the open and from behind stockades and quote a wire sent by Sir George White during the Chin Hills expedition of 1888-89 to the Chief Commissioner, in which the former says the Chins "stood resolutely." There are many officers of considerable experience who are of the opinion that the Chins are no cowards. The Chins idea of warfare is a raid whose object is plunder and not conquest; they had little or nothing to defend, and were firmly convinced we had not come to stay.* They were not aware that they were fighting for their independence and they were not inspired by any sentiment of religion or patriotism. The man who expects an ill-armed mob of savages to fight, under such circumstances, to the death, against disciplined troops, armed with breech-loaders and lead by British officers, is expecting a very high

* Applies to Kachins also.

order of courage indeed. The fact that the Chins displayed in many individual instances bravery, which amounted to heroism, may justify us in hoping that training and discipline will make them serviceable men-at-arms. The question of whether the Chins could be induced to fight for us may be regarded as settled, for Mr. Carey points out that the march of the Nwengal column to Captain Shakespeare's relief in April 1892 proves that the Chins will fight for the British, and that the Chins have accompanied columns to Manipur, Falam, Burma, and Lungleh. In the operations against the *Baungshe* Chins, we were assisted by "friendlies," of whom three were wounded, and again the Chief Kochim joined the Lushai expedition of February 1871, with a contingent of Kanhows (Soktes).

Recruiting.

Mr. Carey says that physically the Chins are fine men, and that should their nature in course of time become amenable to discipline, a recruiting officer should have no difficulty in enlisting men averaging 5 feet 6 inches in height, 35 inches round the chest, and 15 inches round the calf. The finest men are found among the *Siyins, Hakas, and Southerners*, and the smallest among the *Tashons*. Chins are certainly worth a trial, for by the time they are fit for enlistment in the military police, they will probably be equal to dealing with any native race of Indo-China. The experiment should be carried out on exactly the same lines as recommended in the case of the Kachins, with the exception that, as the Chins are not now a frontier people, and as we can consequently prevent the importation of arms, the Chins could be completely disarmed and the levies supplied with a rifle for which they could obtain ammunition only through us. A certain number of rounds per rifle should be served out in the first instance and expended cartridges should be replaced on production of the used cases or on payment of a considerable sum in default. It is usual to allow each village a certain number of guns for defence against wild animals; these guns could be withdrawn on the issue of rifles. There is one other employ for which the Chin is eminently suited, *viz.*, that of a "porter," let us not say "coolie." *It is not uncommon to find a man carrying a load of 180 lbs. for a 12-mile stage in the hills.* Wheeled transport cannot be used for extensive military operations anywhere in Burma, or for hundreds of miles beyond its frontiers. Pack transport is practically non-existent in the country and is hired every "open season" from the Chinese! The Yunnanese authorities have at least once prevented mules crossing the frontier and may

do so again. It is scarcely wise to be dependent on foreigners for our transport, and it would be most expensive and productive of much delay to bring it over from India. Little of the money paid to Chinese mule contractors is spent in the country, and the cost of rationing the posts and escorts in the Chin Hills is something enormous. At the best a Chinese mule can only carry 120 lbs., he takes a long time to load, he straggles, taking up on an average at least five yards of road, he needs to be protected on the march, he can be "spirited away" in a jungle country, he sometimes strays, and his driver is always troublesome and requires to be fed. How much better to employ a man, who can carry 180 lbs., pick up his load in a moment, who occupies two yards of road, can be taught to protect himself on the march, who needs no driver and would not stray! We should employ certain chiefs to provide a certain number of "porters;" we could gradually employ the same men, arm them, and introduce a little order, a little discipline, and a little drill. Finally, we could induce them to work at rationing posts in other parts of the country, organize them by companies, and form battalions of "porters." It is only in India that we find the idea universally accepted that honest work can be dishonorable. The Chin does not consider any means of making money dishonorable; this is perhaps too much of a good thing, but we shall certainly not hurt a Chin's *amour propre* by employing him as a cooly, not thereby unfit others of his race for employment as sepoys. The word "coolie" is, however, associated in the minds of officers and men of the Indian army with something so unsoldierly that we should avoid the use of the word and find some less objectionable title for our corps of *porters*.

The name Panthé has been given (probably by the Burmese) to the Mahomedan Chinese of Yunnan. Panthés. They are known to the Chinese as "Hweitzu" and call themselves "Musellin."¹ The traditions of the people and the accounts of the Chinese go to show that "about a thousand years ago" a certain number of Mahomedan mercenaries, probably Arabs, were permitted to settle in certain portions of the Chinese Empire. The conquest of China by Jengis Khan was the means of introducing a still larger number of Mahomedans, particularly of the Ouigur and Tungani tribes, who took unto themselves women of the country and intermarried with the other Mahomedan settlers. In latter

¹ = Mahomedan. ² = Muslim.

times numbers of Chinese proper were added to the community. Thus the Panthé of to-day is more Turki than Arab and more Chinese than either ; for all that he retains much of his semitic ancestors about him. He is, as a rule, fair, tall, stout, and well-made, differing distinctly in type of face from the Chinese and excelling them in physique. He is very intelligent, industrious, enterprising, and a great trader. Panthés at first filled many high offices of state under the Chinese, but were gradually excluded from military service and the government of the country. Subsequent oppression and exaction resulted in petty revolts, which finally culminated in the Panthé rebellion of 1855. Being inferior in numbers, the Panthés at first carried on a guerilla warfare from the hills, but meeting everywhere with success, they soon descended to the plains and to the siege of large towns. The provincial authorities, in spite of superiority in numbers and resources, receiving no help from the Central Government, succumbed, and a Mahomedan kingdom was established, which bade fair to endure. In 1868 an English expedition to Yunnan found the Panthés in power and was well received. The Panthés then sent an embassy to Calcutta and to London. The Chinese Government became thoroughly alarmed and proceeded to exert itself. Partly by the use of overwhelming numbers and partly by corrupting the Panthé leaders, the Chinese gradually bore down all opposition. Talifu, the capital of the Mahomedan kingdom, was besieged, and, being promised terms, surrendered in 1872—an event which was the signal for the most treacherous and terrible massacres of the Panthés of Western Yunnan.

That the Panthé of thirty years ago displayed military virtues of a high order is an incontestable fact, but he was fired by a sense of injustice suffered and by sentiments of religion and nationality. Under such circumstances a people are apt to surpass themselves, and whether the Panthé mercenary would display, to a notable extent, the qualities we saw in the Panthé patriot, is a question which actual experiment alone can answer. The attempt which has been made to enlist Panthés in the Ruby Mines Battalion of Military Police must be considered an absolute failure. Mogok is distant from any Panthé settlement, living is expensive, the climate bad, the regulation ration of the sepoy unsuited and inadequate to such a voracious feeder as the Panthé, and the general inducements to enlist less than those of many civil careers. The 30 or 40 who have taken service are miserable creatures, not Panthés, but hybrids,

as much Shan or Burman as Panthé. In the case of the Panthé, as in the case of every other people, we must seek the best men, not among wanderers and loafers, but in the home of their race. There and there only are treasured the traditions which foster a martial spirit. Political expediency may forbid the enlistment of the Panthé of Yunnan, but fortunately a source exists from which we may obtain the genuine article in sufficient quantity to enable us to discover exactly what the material is worth, without trespassing on Chinese territory.* After the terrible massacres which followed the fall of Talifu, the survivors, their property confiscated and their persons pursued by the Chinese with vindictive fury, had, for the most part, to flee the country. In many cases these exiles made money and by judicious bribery secured a return to their old homes, but a colony established itself at Panglong in Burmese territory, where it continues to flourish. Its numbers are not very great, less than 300 houses, but they are perhaps sufficient for our present purposes.

An officer should be deputed to Panglong to enquire into the quantity and quality of the material forthcoming and the terms upon it could be obtained. It would

Recruiting. probably be best to begin with a local militia. The men would live in their own homes, go about their several avocations, and do their training as opportunity offered. Agriculturists in Burma are busy just at a time when the weather prevents military operations, and they have nothing to do at a season when the soldier can work all day; an officer from the nearest military police post could visit them frequently, and the Panthé, who has no objection to hard work which is lucrative, and is very intelligent, would soon learn to shoot and to drill fairly. After a time he could be induced to leave his home for a few months in the winter and to submit to discipline. Under certain circumstances their services would be invaluable, and they would probably be more useful as mounted than as a foot soldier. Each militia man who could provide himself with a pony should receive extra pay, which would also be an extra inducement to enlist. One, if not two, companies of infantry and a mounted infantry could be raised at Panglong, which is sufficient for our present purposes.

"The best authorities consider the Malays to be only colonists, who, at no very remote period, settled on the shores of the Malay Peninsula and

* The author estimates the population of Yunnan, in millions, at—Chinese 2½, Shans 1, Panthés ½, Aborigines ¼—total 5.

on the banks of its rivers, and, as pirates, spread gradually through the islands." The Malays may be divided into four "great" and a few "minor" tribes.¹ The *Malays proper* inhabit the Malay Peninsula, almost all the coast regions of Sumatra and Borneo and some of the other islands. They are Mahomedans and speak dialects of the "Javi" language, which is the *lingua franca* of the whole Archipelago, contains some Sanskrit and a good deal of Arabic, and is said to be the easiest language in the world. The *Javanese* inhabit Java, Madura, Bali, and parts of Sumatra and Lombok. They are Mahomedans in Java and Brahmans (Hindus?) in Bali and Lombok, and speak Javanese and Kavi.² The *Bugis* or *Bugesses* inhabit Celebes, are Mahomedans, and speak Bugis and Makassar.³ The *Tagolas* inhabit the Philippine Islands.⁴ The "minor" tribes are savage, and include the *Dyaks* of Borneo, the *Battaks* of Sumatra, the *Jakuns* of the Peninsula, and the *Aborigines* of North Celebes, Sula, and Bouru.⁵ Of Malays proper there are 100,000 in Perak³ alone and perhaps not less than 300,000 in the whole Peninsula.

These tribes of course differ considerably in many ways. The real Malay⁴ is a short (average 5 feet 3 inches), thick-set, well built, active, and powerful man, with straight black hair, a dark-brown complexion, thick nose and lips, and bright intelligent eyes. His disposition is generally kindly and his manners polite and easy. He has a strong sense of humour, but is grave and reserved with strangers, being cautious and suspicious without seeming so. He is fond of his country and his people and will protect his relatives at all costs, he has a great respect for constituted authority, will blindly carry out the orders of his hereditary chief, and is courageous and trustworthy in the discharge of an undertaking. He is free from fanaticism. He never drinks and is rarely an opium-smoker. He is cleanly, fond of ornament, and imitative. He considers hospitality a sacred duty, is a thorough sportsman, manly, brave, and very docile when properly managed. On the other hand, he is extravagant and a gambler, fond of borrowing and slow in repaying money, a fatalist, very superstitious, averse to hard labour, lazy, and with no sense of order. He resents anything like rude or angry language, is quick to take offence and will brood over an insult, real or imaginary, which he

¹ Colonel King-Harman, No. 120, Volume XXIV, 1895, this Journal.

² Wallace as quoted by Colonel King-Harman. ³ Swettenham "Malay Sketches."

⁴ Swettenham, Wallace, Foster (précis of information, "Malay Peninsula") and others.

generally wipes out by indiscriminate murder (amok). He will resist the introduction of innovations, if suddenly thrust on him, but, if given time, he is open to conviction. He is quickly elated and rapidly depressed. Till fifteen years old his behaviour is exemplary, for the next ten years he "sows his wild oats" with a lavish hand and thereafter gradually reforms. The trustworthiness and the courage of Malays is beyond question. A party of Malays armed, mostly with spears, will hunt a tiger on foot, though the result is usually the death or serious injury of one or more of the party.¹ When not interfered with they engage in desperate fight and blood feuds.² As traders they have proved themselves fearless and skilful navigators and as pirates a formidable enemy,³ and they are sometimes employed as quartermasters by our best steamer lines—positions almost always held by Europeans. That they will take service in the future is probable from the fact that they have done so in the past with the Dutch, the Portuguese, and the British.⁴ The Ceylon Rifles was well known to be a very smart and efficient corps and was very highly thought of there.⁵ It is true there was some difficulty in obtaining Malays for the Pegu Light Infantry, but some were obtained and were a distinct success, while numbers of them are employed in the police at different places.⁶ "The Malays are seen in their true character only in their own country..... To understand the Malay you must live in his country, speak his language,.....humour his prejudices, sympathize with him, and help him in his trouble,.....only thus can you hope to win his confidenceThe white man, whose interest is strong enough, may win, not only confidence, but the devotion that is ready to give life itself in the cause of friendship." In considering the "best method of recruiting" Malay, it is quite

Recruiting. evident that the officers selected to enlist them must know the language and the people, and should possess a sympathetic nature and strong self-control. Colonel King-Harman represents Mr. H. Sinclair as recommending Penang and Singapore as recruiting centres with depôts throughout the Native States. Two officers should be selected and sent, the one to Singapore and the other to Penang, with orders to place themselves in communication with the officers commanding the Malay Police in those places and to study both the language and the people. In the meantime the local police officers should be called upon to report on the

¹ Swettenham. ² Colonel King-Harman. ³ Normans, "Far East," etc.

best system of recruiting, the establishment of depôts, and the districts to be exploited. As recruits come in they should be collected at the centres (Singapore and Penang), quartered near the local police, from whom a few instructors could be procured and whose officers should advise and assist the officers deputed by the Indian authorities. In a few months our officers would acquire some knowledge of their men, their language, and the way to manage them, and the men would be settling to their work. The employment of Malays in India seems neither expedient nor necessary. The peoples of India are quite equal to supplying all that India requires in the way of soldiers, and the country is perhaps not very suited to Malays. It is the requirements of Burma which constitute such a strain on the resources of India, and it is the climate and country of Burma which are so unsuited to the natives of India and to which conversely the native of India is so unsuited. While, on the other hand, by habits, birth, and religion the Malay is exactly suited to Burma. The Malay will at first, no doubt, find the restraints of discipline somewhat irksome, and we must take every advantage of "tempering the wind to the shorn lamb." It is of course necessary to maintain a proper discipline in the military police, but it is not necessary to demand the same "finish" which we require in the regular soldier and which is only to be obtained by an attention to petty detail so intolerable to an undisciplined people. All the time that the newly raised companies remain at Singapore and Penang, the Indian Government will be spending money without an immediate return, it would be possible to take these companies into the military police sooner than into the regular army. As has been said, the military police in Burma should be regarded as a preparatory school for the local regular forces. An experiment can be more fully and more easily tried and more easily dropped without exciting so much notice in the event of failure in the military police than in the regular army. The military police requirements constitute a greater drain upon the warrior races of India than do those of the local regular forces of Burma. The companies raised at Singapore and Penang would have to be in excess of whatever our establishment might be at the time, and by showing them as belonging to the military police, the extra expense would be borne by the civil instead of the military budget! and regular battalions could always be formed from the Malays in the military police as soon as sufficient numbers of sufficiently trained men were forthcoming.

The Was are a people who are, for the most part, independent, but their country lies within the red line of the British border and their time must come. Meanwhile we have been in collision with the "wild Was," and our officers were much struck by the quickness with which a contingent of "friendlies" picked up our ideas of deploying and skirmishing and by the pluck displayed by both sides. Their religion and state of civilization is much

the same as that of the Kachins, and they are head-hunters like the Nagas, they should be enlisted in the same way by small levies to be gradually collected into class companies in the military police.

Recruiting.

Assam.

The tribes of Assam possessed of some military qualities are—

The extra-territorial and independent hill tribes of the northern border—the Akas, Daphlas, Niris, Abars, and Mishmis. They have the yellow Mongolian type of features, and, with the exception of the Western Daphlas, are of fine physique. The Miris are the most important of the group and are the only ones who have forsaken their ancient Shamanism to any considerable extent (Miris—H. 26,574, A. 10,856).*

Abar group.

The Kacharis (H. 62,337, A. 181,021) were probably once a numerous and powerful people, dominant over nearly the whole of Assam. They are very nearly allied to the Lalungs (H. 798, A. 51,625), Rabhas (H. 9,477, A. 60,297), Hajungs (H. 7,567, A. 903), Mechs (H. 759, A. 69,442), Rajbansi (H. 123,751), and Kochs (H. 250,897, A. 3,159), of whom the two last only are agriculturists.

Kachari group.

The Garos (H. 634, A. 119,120) are a robust, active people of middle height, possessed of much endurance. They closely resemble the Khasis (H. 1,405, A. 116,428) and Syntengs (A. 51,739).

Garo group.

The Chutyas (87,691) and Ahams (153,528) are Hindus of Shan descent. The former were at one time dominant in Upper Assam, while the latter by the end of the seventeenth century had extended their rule over all Assam to Golapura in the west; they defeated the utmost endeavours of the Mughals to acquire Assam and appear to have been a bold and warlike race.

Shan group.

The Chutyas (87,691) and Ahams (153,528) are Hindus of Shan descent. The former were at one time dominant in Upper Assam, while the latter by the end of the seventeenth century had extended their rule over all Assam to Golapura in the west; they defeated the utmost endeavours of the Mughals to acquire Assam and appear to have been a bold and warlike race.

* H. Hindu, M. Mahomedan, A. Animistic; figures from Assam Census Report, 1891.

The south-eastern highlands are inhabited by Nagas (102,085), Mikirs (94,829), Kukis and Lushais, who are Shamanists, and the people of Tipperah (H. 3,181, A. 5,478), and Manipur (H. 63,381, M. 7,421, A. 526).

The British have at various times been in collision with nearly all these people, and there is sufficient data available to form some idea of their military value. But whatever their fighting qualities may be, the fact remains that such as can be rendered loyal servants and amenable to discipline must be considered suitable for employment in the military police. The more these tribesmen can be induced to take service in Assam, the greater will be the number of Gurkhas available for employment in Burma, the greater the consequent possible elimination of the plainsmen of India from the local forces of Burma, and the greater the relief to the sources from which those plainsmen are drawn. Some of these tribes may, in time, prove fit for admission to the regular army, but they are not so at present, and their employment in the military police, while not without value in the present, may be regarded as the best means of realizing the possibilities of the future. The Angami and perhaps the Kacha Nagas are the most promising, and the Tunkals exhibit the same extraordinary carrying powers as the Chins. The methods of enlisting the wilder tribes should be the same as those suggested in the case of Chins and Kachins, while others, like the Kacharis, who already take service to a limited extent, can be enlisted direct.

There remains but one "hitherto untapped source" for our consideration, *viz.*, the Chinese.

Because the Chinaman is a possible enemy, because he is a foreigner, and because there exist a very general doubt of his courage, the vast majority of officers would have no hesitation in deciding against his employment. But he is no more a foreigner and a possible enemy than were Pathans and Afghans, and upon what do those base their opinions who question his courage? Mainly upon the result of the late war. Coolies collected in herds on the spur of the moment, absolutely unprovided with the necessities of modern war, officered by civilians and required to lead their leaders, constitute an "army" more despicable than the armed mobs of other countries, which are never readily formidable to disciplined troops even when composed of men habituated to the use of arms and intoxicated with patriotic

enthusiasm or religious fanaticism. But what can we expect of the dregs of a population, which, as a whole, is not merely unused to arms, but positively despises the calling the soldier and displays amongst its most notable characteristics and intelligence which enables it to appreciate the impossibility of military success and a freedom from sentiment of any description so absolute as to render gratuitous self-sacrifice indicative of mental derangement. But it is barely a century since the Chinese successfully invaded Nipal, barely half a century since they beat the British squadron from the Pei-ho Forts, and not a decade since the "Black Flags" defeated French expeditions. General Gordon and Lord Wolseley, not to mention many others, who saw with their own eyes and possessed the rare faculty of seeing clearly, have emphatically declared their belief in the Chinaman's valour. We are always prone to form an opinion of a people from the individuals we have seen. With rare exceptions, Europeans have personal experience only of the Chinese of big towns and treaty ports and of the "baba" or "12 o'clock Chinamen" of British possessions. The inland Chinaman and particularly the highlander of Hunan and Yunnan is a very different person. He has courage, fine physique, extraordinary endurance, few wants, and no prejudices. He is sober, hardworking, thrifty, intelligent, and absolutely submissive to constituted authority. He will be guided only by his own interests, and he is so ignorant of patriotism that he will fight against as readily as for his country. The intention here is neither to advocate nor to deprecate the employment of Chinese as soldiers, but to urge that the general opinion of their military value is a mistaken one. Should we ever decide on employing them, we must begin by recruiting

Recruiting. class companies in mixed frontier battalions of military police; and the opinion is hazarded that the employment of Chinese will be one of the greatest questions of the future.

Conclusion.

We have now concluded our review of "hitherto untapped sources" and the "best method of recruiting" from each, and it only remains to make a few final remarks.

Races, which have been before the military public for some time, have been accorded the briefest notice, while little known, and in some cases less important peoples have been treated at greater length. The origin, characteristics, and prejudices of the latter have been discussed with a view to

discovering that method of recruiting from them most calculated to suit their idiosyncracies. Some reference has also been made to the recruiting of old material, but only as affecting the recruiting or the employment of the new.

The "company area" may be considered too minute a division, but, with the disappearance of single companies of a class from our regiments, larger districts could be selected. In any case the intention has been to illustrate an idea rather than to make a specific suggestion. In this connection we may note that the larger the number of any class in a regiment, the greater the quantity and the better the quality of recruits of that class forthcoming—a fact which should enter largely into any discussion on recruiting, but too large and too delicate a subject to be treated here.

The extent and nature of the employment of a class must also greatly affect recruiting from it—considerations which prompt the following remarks :—

The fighting qualities of the Afghan and Pathan are undoubted, and, from the nature of things, it is probable that they will retain their warlike proclivities longer than the races living under the ægis of the *pax Britannica*; but their religion enters so largely into their daily life that their considerably increased employment is to be deprecated. This objection does not apply to Hazaras, Baluchis, Malays, and Panthés, who, though Mahomedans also, are free from bigotry and fanaticism. At the same time we may remember that the Pathan, as a hillman and possessed of a quick intelligence rare in the native of India, is more suited than the latter to employment in a mountainous, jungle covered country like Burma. He should not, however, be enlisted in the military police, because he requires the direct supervision of officers accustomed to manage him.

So considerable is the supply of the Kshatriya classes of Gurkhas and so few their numbers now in our ranks that they have been treated as a practically "untapped source," and, as has been said, experience has proved the material excellent. Recent campaigns in Europe seem to show that, while the proportion of casualties to the total numbers engaged in a modern battle may be less than heretofore, individual units may be practically annihilated. For which reason it is necessary that we should be able to make good, from instantly available resources, any losses a unit may suffer on service. Hence the linking or grouping of battalions. There exists but one battalion composed of Kshatriya Gurkhas to link it with a

similarly situated battalion of Garhwalis would appear inappropriate, for the former class boasts its conquests over the latter, and the latter remembers the oppression of the former. We should therefore raise at least one more battalion of either class. But we do not require Gurkhas in the Bengal army; they are not suited for garrison duties on the plains, and good plainsmen are forthcoming in numbers sufficient for the requirements of the armies of India. Kshatriya Gurkhas are somewhat given to Brahmanical prejudice; they may be affected by Hindu religions or political movements in India, and they would be likely to influence their lower caste compatriots, who are at present regarded as absolutely dependable. But high caste Gurkhas are eminently suited to service in Burma, and plainsmen of India are the reverse; the former eats rice and the latter "atta," which makes all the difference in cost of rationing. The more we can eliminate the latter from the local forces, the more we can relieve the strain on the sources from which they are drawn—a consummation devoutly to be desired. Finally, the religious or political opinions of the former matter little in Burma. If officers and men will consider that while on the one hand Burma is being rapidly opened up and the conditions of life rendered more comfortable every day, and that, on the other hand, Burma is a frontier province, whose troops are practically face to face with the *Légion Étrangère* and the *Infanterie de la Marine* of France, they should have few regrets in exchanging a career in Bengal for one in Burma! Almost all that has been said of the high caste Gurkha applies with equal force to the Garhwali, the Rai, the Limbu, and the Niwar.

Of absolutely untried peoples the majority are sunk in a state of savagery, in which their vices almost neutralize their virtues. But their vices are just those of the heathen Karen, and they are susceptible of the same improvement. Races of exactly the same origin, religion, manners, and customs have become Mahomedans, Buddhists, Hindus, or Christians. The animistic tribes of Assam and Burma are ready to exchange their terrible and malignant demons for milder and more benignant deities; all these races are more in contact with Hindus than with men of other religions, and they bid fair to become Hindus. But, if only from the point of view which concerns us here, *vis.*, recruiting, we want them to become Christians, neither the government of Indian peoples nor officers of native regiments can directly concern themselves in the conversion of these peoples; but much can be done to encourage missionary enterprise

Not only are these peoples savage, undisciplined, and vicious, but their courage even has been questioned. We have gained repeated victories in Afghanistan against overwhelming numbers, advantageously posted, comparatively well armed, intoxicated with religious fanaticism, and inspired by a spirit of patriotic independence, yet the reputation of the Afghan as a gallant soldier has not suffered. The histories of peoples generally reckoned the most valorous are full of instances which make us question whether they are such heroes as we suppose. Let him who doubts this read "A Summer Nights Dream," "24 hours of Von Moltke's Strategy," and General Sheridan's remarks on the Franco-German war. The fact is that all men are cowards is about as true as that all men are brave. Who would have expected that men of the same race as those soldiers, who, unresisting, cast themselves on their knees in tearful supplication for mercy, before the Mahdists of the early '80s, when trained and lead by British officers, would defeat their victors a few years after! May we not hope for as much from the highlander of Assam and Burma? After all we do not require of him, at present, a very high order of courage; we want him, as a military policeman, to keep his brethren in order, and it is contended that he is not altogether without promise of proving worthy of employment as a regular soldier.

It may appear that too much has been said of Further India, its peoples, and its requirements, but it is urged that the least known races, which are also those which have been treated at greater length, are to be found there, and that while the composition of the armies of India proper, though always bound to change, has, to a certain extent, crystallized, that of the forces in Burma is not now suited to its requirements, to which it is bound to conform, and, therefore, to alter considerably.

It is often asserted that as the tribesmen on our frontiers come to appreciate our power they will "cease from troubling." "Hard words break no bones;" when we resort to blows we never deliver those of the "knock out" description, and it is presumably impolitic to do so: how then shall the tribesmen "come to appreciate our power"? That *omne ignotum pro magnifico* is only true when the human imagination is capable of a conception surpassing the reality, but the ignorant tribesman is quite unable to realize military discipline and organization, unless he has personal experience of both. If in a tribe there be old men who are pensioners and young men who are

soldiers of the Indian army, then we may expect that tribe to appreciate our power and to behave accordingly. Moreover, we find a suitable employment for its wilder spirits, and we may be certain that there is no measure more calculated to keep our frontier tribes quiet than that of enlisting from amongst them for the Indian army.

In conclusion it is submitted that the methods of recruiting suggested are simple, inexpensive, practicable, as easily abandoned as adopted, and neither unsuited to the peculiarities of the people, nor likely to result in mischief in the event of failure. When we consider the material at our disposal, we may reasonably anticipate that the adoption of a thoroughly systematized method of recruiting, which, subject to political and financial considerations, shall exploit every suitable source of supply in accordance with the quantity and quality of the material in each, will, in time, give us an army, which, whatever its defects in leading and coherence, will have *no superiors in courage and no equals in physique!*

TABLE I.

Caste returns—local forces, Assam and Burma.	Border tribesmen (Pathans).	Panjabi Mahomedans.	Other Mahomedans.	Sikhs.	Dogra.	Rajput.	Jat.	Brahmin.	Mahrattas.	Other Hindus.	Gurkhas (all classes).	Garhwalia.	Kacharis, Rabhas, etc.	Miscellaneous.	Karens.	Panthys.	Garos.	Kulis.	Nagas.	Manipuris.	Totals.
7 Battalions, Burma In- fantry.	348	1,824	114	2,508	228	228	...	228	...	...	912	...	...	...	...	...	...	...	...	...	6,384
Burma Military Police	199	2,408	710†	4,146	180	1,036	493	933	121	651	2,380	374	315	24	844	38	...	...	...	...	15,072
Assam Military Police	...	...	...	...	223	...	...	...	...	...	2,054	...	395	153‡	...	...	87	11	10	8	2,023
Totals	547†	4,292†	824§	6,654§	631†	1,264†	453†	1,161†	121†	651†	5,546	374	710	159	844	38	87	11	10	8	14,379

* Hindustanis.	!	† Mostly Hindustanis.	!	‡ Mostly Assamese.	!	§ Atta-eaters, mostly plainmen of India, 16,592.
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TABLE II.

Summary of methods of recruiting.

Tribes of the N.-W. Frontier.

- (1) Tribal levy.
(2) Frontier militia.
(3) Regular army.

Some N.-W. Frontier Tribes—Korens, Malays, Peninks, Chinese, Kacharis, Ahams, etc.

- (1) Frontier militia or military police.
(2) Regular army.

Some N.-W. Frontier tribes and others--Direct enlistment;

Tribes of Assam and Burma.

- (1) Tribal levy.
(2) Military police.
(3) Regular army.

THE BICYCLE AS A WARLIKE APPLIANCE.

BY MAJOR J. L. KEIR, R.A.

The question of the employment of cyclists in war is one that is, at the present moment, exercising the minds of military experts in all the leading armies of the world. Opinions as to the exact sphere of their usefulness differ considerably, for while some consider that they will be of value up to the fighting line, and favour the use of folding machines, others seem inclined to restrict them to a less forward position. All, however, agree that used in its proper place the influence of the cycle will be considerable.

In these pages it is proposed to consider the value of the bicycle as a warlike appliance, with special reference to its employment in this country ; but, before doing so, it is thought that a glance at the development of military cycling in other countries may assist us in forming an estimate of its present, and perhaps future, worth.

Up to quite recently the Germans were on the side of those who valued the bicycle only as a means of communication. Experiments, however, carried out by them more recently have proved beyond doubt not only its usefulness when the two combatants are seeking touch of one another before the actual combat takes place, but also that a well trained and organized body of cyclists will in some cases be of equal, if not greater, assistance than the mounted infantry of our army after fighting has commenced.

The following account is taken from a translation from the *Revue Militaire de l'Etranger* by Lieutenant-Colonel J. H. G. Browne, late Royal Artillery, entitled "The Military Cycle in Germany," and was published in the January number of the R. A. I. Journal :—

"The army (II and IX Corps) was under the command of General Waldersee, a determined advocate of the employment of the bicycle in the field. In the IX Corps he formed the greater part of the cyclists into a single detachment under the orders of special officers, and armed them with rifles slung over the shoulder. His object was to make use of their great speed, of their power of travelling long distances in a short time, and of the silence of their march,

“ to assist the cavalry in reconnoitering, to support them in
“ rapidly occupying important posts, in covering columns of
“ infantry, etc., etc.”

Here follows at some length an account of the doings of the cyclists, which may be summarised as follows. An important passage of a river which separated the two corps had to be seized, and the General determined to use his cyclist detachment for the purpose. They not only successfully accomplished this task and put the bridge in a state of defence, but by means of a patrol gained touch with the enemy and sent back valuable information to head-quarters.

The writer concludes his article as follows :—

“ This experiment, together with the attention given during
“ the manœuvres to all questions connected with military
“ cycling, seems to indicate that in Germany there is a tendency to develop this service and to make it participate in
“ an effective manner in operations which have hitherto devolved entirely upon the cavalry.

“ Without sharing the enthusiasm of those who already
“ dream of transforming the cavalry into a cyclist corps, it cannot be denied that the experiments made during these last
“ manœuvres have, in a remarkable manner, enlarged the
“ sphere to which the use of the bicycle in the field had previously been relegated.

“ Ground will always continue to be an often insurmountable obstacle to machines, which, moreover, would soon
“ become unserviceable if frequently used off the roads.

“ But the service of reconnoitering and the rapid transmission of orders have developed to such an extent with modern
“ armies that they enormously weaken the effective strength
“ of the cavalry and make it absolutely necessary to welcome
“ any means which may aid it in its mission and render it
“ stronger for the actual combat.

“ It would appear that this part can be advantageously
“ played by detachments of cyclists ably and energetically
“ led. Such means, if placed at the disposal of independent
“ cavalry divisions, by increasing their liberty of action, their
“ security, and their effective power, should lead to results of
“ undeniable importance.

“ By preceding infantry columns during the march and by
“ patrolling to long distances, both day and night, when they
“ are at the halt, cyclist detachments would assist and, if
“ necessary, might replace the divisional cavalry, which would
“ thus become available for other employment. But duties

" of this kind ought not to be entrusted to groups thrown together by chance, without cohesion and without special instruction."

An officer who attended the IX Corps manoeuvres in the neighbourhood of Harburg in the following year (1896) reports—

" The cyclists were largely used as mounted infantry. The point of every advanced guard was a squad of cyclists (in a brigade 40, with a division about 60). They all carried the rifle slung and a few were used as messengers, the remainder as a rapidly moving body of infantry."

The above shows a still further development of the military cyclists of Germany, and seems a step towards their formation into a separate body.

At present the training and organization of the military cyclist in Germany is as follows :—
Training and organization.

Each battalion commander selects men to be trained as bicyclists, and they are put through a course of instruction, at the end of which a military cyclist, when on the march, is expected to be able to read a map, or written order, and use his revolver.

There are war cycles destined for service in the field and instructional cycles for training men, somewhat stronger and used for garrison work. Instructions for their employment are contained in the Manual of Field Service.

Their equipment consists of a revolver with ammunition pouch, and a side-arm fastened to the cycle.

There is no separately formed body of cyclists, and the men receive their training with the troops. After leaving the colours, if called up, they are drilled with arms, unless specially detailed for cycle work.

The French have from the first been great advocates of the use of cycles in war, and their military journals are seldom without some article bearing on this subject.

In 1896, 322,000 bicyclists paid tax, giving a revenue of 3,000,000 francs. In 1893, when the tax was first introduced, the amount realized was only 1,000,000 francs. In 1894 Captain Gerard's folding bicycle was adopted by the French. This machine weighs from 26 to 28 lbs. and takes half a minute to fold and unfold, and has, we believe, proved a complete success.

Their rules laid down that cyclists are to be used singly, or in small detachments in the field for purposes of reconnaissance; and in larger bodies for security and minor operations.

This consists of a cavalry carbine carried in a leather case on the machine and 120 rounds of ammunition.

Equipment.

Distribution in an army corps—

To staff of army corps . . .	19	To infantry division . . .	11
„ cavalry division . . .	8	„ „ brigade . . .	2
„ infantry regiment . . .	4	„ corps artillery . . .	2
„ cavalry „ . . .	2	„ artillery park . . .	2
„ engineer company . . .	1	„ field hospital . . .	1

Total with army corps—97.

Austria has during the past two years shown a considerable interest in military cyclists, as the following extract taken from the *Journal of the*

Austria.

Royal United Service Institution, August 1896, will show:—

“ A memorandum, dated 22nd May, from the Imperial War

“ Ministry, concerning military cyclists, runs as follows:—

“ It is intended as in previous years to employ cyclists in the manœuvres for combined arms, and for this purpose to call up those officers and men of the reserve who declare themselves ready for this service. Each cyclist must bring with him a serviceable machine of his own for the use of which 20 florins (about £2) will be paid. Serious injuries to cycles happening during this service will also be made good. The commanding officers of infantry and rifles are to summon those who are known as cyclists and are at the time liable to military training to come in with their cycles. The necessary reports are to be sent in to the territorial commanders' offices by 1st July. The latter will then report to the Ministry of War by July 10th how many persons have declared themselves ready to serve with their cycles. The War Ministry will proceed, if necessary, to distribute them among the different corps districts and will furnish instructions for the employment of the cyclist service with this year's combined manœuvres. All corps of infantry and rifles must also send in by July 1st to the territorial commanders' offices returns of all subaltern officers and non-commissioned officers and men of the active and reserve lists who can ride cycles. From these returns a complete list, arranged by corps, will be made out in the territorial commanders' offices and sent to the War Ministry by July 10th (*Militär Zeitung*, 8th June 1896).”

In the February 1897 number of the Royal United Service Institution Journal we read—

“ During the Austro-Hungarian grand manœuvres the cyclists were actively employed both independently and in support of other troops. On the last day of the operations they supported a cavalry charge with a lively fire, after which they formed up as the reserve of an infantry division, not, however, without receiving warm thanks for the assistance they had rendered.

“ A report on the manœuvres states that they completely succeeded in proving that in a campaign a detachment of well instructed cyclists is capable of doing much more important service than has been hitherto thought possible. This is especially so since the difficulties of the ground have, so to speak, disappeared in the presence of the folding cycle. It is remarkable that, although during the six weeks of the manœuvres the machines travelled from 2,400 to 2,800 kilometres, they sustained no serious damage. These results obtained in Austria fully agree with those recorded in France after the manœuvres of 1896 (*Revue du Cercle Militaire*).”

A writer in an American Military Journal estimates the present number of cycles in his country at
 America. 1,000,000.

The Army and Navy Gazette of 14th November 1896 contained the following:—

“ The bicycle for military use is now an assured success in the United States. It has just been put to a severe test in the Far West, and has shown beyond doubt that, however problematical may be its advantages in the actual battle, it is already of vast practical utility in various other purposes of military necessity.

“ The test was made by a detachment of eight men of the 25th Infantry at Fort Missoula, and was under the command of Lieutenant Moss. The men chosen were ordinary riders and the bicycles were the ordinary output of one of the big standard concerns of the East. The test was to be 1,000 miles over common mountain roads with the riders equipped for such exigencies as might befall them in a scouting, or messenger run through a hostile country. Besides 130 lbs. of rations, the party carried a complete rough camping outfit—blankets, rifles, 30 rounds of ammunition per man, extra tyres, etc. The average weight of the wheels packed was 77½ lbs. The weight of wheel and rider ranged from 272 to 202 lbs. each. The result of the march was a surprise

“ even to the strongest supporters of the bicycle. Lieutenant Moss reported that both soldiers and wheels had stood the journey remarkably well. The test was made as thoroughly as possible and under all conditions. They had ridden in all kinds of weather; through mud, sand, and dust, and scarcely a hitch occurred.

Considered as above, the following advantages are claimed

Advantages claimed for the bicycle as a warlike appliance:—
 (1) That, under favourable circumstances, it enables an armed and equipped man to cover great distances without distress.

The favourable circumstances being good roads, such as the ordinary ‘pucca’ ones of the plains of India. And it may be affirmed, without fear of contradiction, that in no country in the world are there tracks more favourable to cyclists than in this country.

Advantage 1.

As an instance of what may be achieved by military cyclists, the following may be of interest:—

In 1895 the 1st Volunteer Battalion, Royal Fusiliers, consisting of a team of five men, equipped with great-coats and water-bottles and carrying rifles and ammunition, won the long distance challenge cup for the year by covering a distance of 101 miles in 6 hours 35 minutes. The competition taking place in the winter along the ordinary English country roads.

With regard to this Lieutenant W. C. Davis, 5th Artillery, U. S. A. Army, says—

A column of bicyclists, on good roads, can maintain with ease a uniform gait of 7·5 miles per hour for 7 hours, or cover a distance of 50 miles daily. Carrying the luggage on the wheel this distance would be about equivalent to a march of 10 or 12 miles for infantry on the same road, carrying their luggage on the back.

(2) That with ordinary care it costs little to maintain, and the ordinary repairs can be executed without the assistance of skilled labour.

Advantage 2.

That almost any person can learn its use in a very short time, and without the aid of a special instructor.

Advantage 3.

It will be admitted that there is, or perhaps it would be more correct to say that there was, no greater “cyclophobe” than the horseman, and the reason is not far to seek. The road, hitherto the prescriptive platform of the horse, became suddenly invaded by numerous strange objects, half man and half machine,

Relations between horseman and cyclist.

who challenged his performances both of speed and endurance, and even hinted that his day was past.

A consideration of the merits of both will, however, clear our minds on this point, and show that the cycle should not be looked upon as an enemy of, but rather as a benefactor to, the horse.

The case has been very well put by two American officers, whose remarks on this subject are quoted below—

Lieutenant Whitney, U. S. A., says "The bicycle is not a perfect substitute, but a cheap, effective, and speedy accessory to the horse, and in many cases his superior."

Lieutenant Hill, U. S. A., writing on the same subject, observes—

"The bicycle is to-day a permanent feature in the world's economy, and it is to be hoped that neither cold military conservatism, which judges too frequently almost with ferocity and without investigation, nor the blind enthusiasm which grasps at everything new, with an equal lack of investigation, will exclude the wheel from its greatest function, *vis.*, to enable the infantry to have at hand without expense and care for grooming, feeding, and watering, a cheap, convenient, and swift means of transportation from point to point."

In fact the cycle is not a rival of, but a valuable auxiliary to, the troop horse, which comes to his aid to relieve him of that dull hammering along hard roads, and to allow him to devote his whole energy to transporting his rider across the open country, so as to reach the field of battle with the least possible amount of his strength and efficiency impaired.

This brings us to a consideration of the useful vocations of the military cyclist, which may, we venture to think, be classified under the following four heads:—

- (1) Road orderlies.
- (2) Road reconnaissance.
- (3) Road patrols.
- (4) As mounted infantry to seize strategic points, and assist the cavalry in reconnoitering.

Taking these headings in order, we first come to consider

- (1) Road orderlies. the cyclist as an orderly.

In this capacity he is unrivalled, for, given a good road, he can convey messages to great distances at a high rate of speed, and is always prepared to start at a moment's notice. The machine being inanimate requires very little attention, and suffers neither from exposure nor from overwork.

Amongst other useful openings for him in this capacity the following suggest themselves :—

- (a) The maintenance of communication between different bodies on the march, and the forwarding of information from the front to the formed bodies in rear.
- (b) The transmission of orders and reports on out-post duty.
- (c) All orderly duties in cantonments.
- (d) And generally to save as much as possible requisitions for orderlies from the cavalry squadrons.

The value of the cyclist as a reconnoiterer of roads depends on the country he has to traverse. On a good road and provided with an enlargement of the small scale war map and a cyclometer to denote his exact position, a rapid and accurate report of any road could be made.

Any one who has had to perform this duty on a restive horse maddened by summer flies, or on a noisy trooper borrowed for the occasion, will admit the advantages of a good bicycle for the purpose.

In the performance of this duty one great merit of the bicycle for military purposes deserves notice, *viz.*, its freedom from noise, and this makes it especially useful for night work. On good roads great distances could be covered by patrols and information of an approaching danger rapidly transmitted to the line of resistance in rear.

Further, it would appear that in the case of two opposing forces in contact in an enclosed and difficult country, that the one which was provided with cycles would have a great advantage over its adversary, not so provided, and would be able to rest in greater security with a far less expenditure of labour.

The question of the largest number of cyclists that can be conveniently used on a single road, and the space they would occupy, is a subject for experiment ; but even limiting the maximum number to fifty, many cases will occur to us in the past history of India when a European force of this size, suddenly presenting itself from an unexpected quarter, would have saved many valuable lives, and produced very great moral effect. Moreover, the sudden appearance at night of a force of unknown strength, whose approach had been made in perfect silence, would undoubtedly produce a demoralizing effect, and

might even render possible a successful surprise. And we even venture to think that numerous small flying columns composed of cyclists, moving rapidly from place to place for raiding purposes, is not an altogether visionary conception with regard to the wars of the future.

A threatened invasion of India, or a serious war beyond its frontiers, would leave the interior guarded by a comparatively attenuated garrison, and an increase of the mobility of this force and of its power to strike rapidly would have considerable effect in maintaining peace and order in the country. In the same manner that a vigorous heart causes the blood to circulate more freely to the extremities of the body than a weak one, so a military centre, occupied by a mobile force, can make its influence felt at a much greater distance than one whose zone of action is restricted to a score of miles from its head-quarters by the inability of any portion of its garrison to move quickly over long distances.

Thus small parties of armed men moving rapidly from place to place at uncertain times would tend to restrain isolated outbreaks, and give confidence and support to the civil administration in the more isolated stations of districts.

In a position like that we have under consideration the force of cavalry at disposal would be quite unequal to meet the many demands on it, and nothing is more wearing to horses than continuous movement at a rapid pace along roads for orderly work, patrolling, etc. What, therefore, is proposed is that a well organized and equipped corps of cyclists should relieve the cavalry of many of these arduous duties, and so release a larger number for service at the front.

The numerous good roads, the smallness of the gradients, the comparative absence of wind, and the ease with which ordinary tracks can be traversed at most seasons of the year combine to render India the country "par excellence" of the cyclist. Two things are, however, at present necessary for his development, *viz.*, encouragement and organization. We shall therefore proceed to examine the best means of procuring these.

The encouragement of the military cyclist, by which, amongst other things, is meant his recognition as a special branch of our service, and the apportioning to him of certain fixed duties in peace and war, is at present practically *nil*. For although our Infantry Drill Book (page 147) mentions that cyclists may be

The cycle considered with special reference to India.

Encouragement.

employed on good roads with the advanced guard, there is no special provision made for their maintenance, and they only exist in so far as supplied by voluntary contributions from regiments.

How, then, can we best encourage our military cyclists? In answer to this question the following means are suggested :—

- (1) The adoption of a thoroughly good service machine suitable to this country which would be purchased by soldiers from the Ordnance Department on certain conditions at moderate rates.

With regard to the pattern of this machine, Lieutenant Davis, U. S. A., considers that a military cycle should possess the following characteristics :—

- (a) To insure sufficient strength, the machine should be built of the finest material and should weigh at least 32 lbs.
- (b) The tyres should be pneumatic, "puncture-proof," and extra heavy. Tyres of large cross section (2.5" in diameter) are judged the best.

Note.—With the exception of one country, the Government military cycles abroad, so far as the author has been able to learn, are all equipped with the old style of tyres, and their weight ranges from 45 to 55 lbs. The exception noted is Italy, which has recently adopted a pneumatic tyred machine, weighing about 35 lbs.

- (c) The military bicycle should be equipped with a powerful brake. The direct acting plunger brake is thought the best. The brake should be made renewable and of such material that the wear should be upon it rather than upon the tyre.

He further considers that the chain should be eliminated and the bicycle should be made portable. That it should be inconspicuous, and that the fittings, saddle, etc., should be carefully considered and worked out.

- (2) The levying of an annual wheel tax on all bicycles not registered, or imported into this country for State purposes.

- (3) The registration of all military cyclists at each station and the regular employment of a certain number, of those who volunteer, at field days, under an officer selected for the purpose.

- (4) The offering of prizes at the annual assaults-of-arms, regimental sports to military cyclists. Competitions to take the form of long

distance rides along roads by squads, rapid road reconnaissances, or runs by night.

(5) The annual concentration of the cyclists of a district at some central point where they could be exercised in accordance with a pre-arranged programme.

At home the volunteers supply a fine body of well equipped and highly trained cyclists, and with a slight effort there is no doubt that many volunteers in this country would come forward for the same service, and by joining with the regulars at such meetings would receive sound and useful military training.

(6) The abolition of all mounted orderlies for ordinary cantonment work, and their replacement by cyclist orderlies mounted on machines supplied to Government offices.

(7) The formation of a cyclist corps composed of volunteers from different regiments at all large camps of exercise held during the winter. The whole being under the command of a selected officer charged with a report of their doings during the duration of the camp.

To sum up. With fair treatment, sympathy, and an acknowledged status, there seems to be no reason why we should not be able to rapidly promote the growth of a fine body of military cyclists in this country.

We next come to the question of organization, and here money, the ruling factor in almost every scheme, has first to be considered. In this respect we are, however, fortunately placed, for, as we hope to be able to demonstrate, in the present instance it is more a matter of turning to account the existing means than the expenditure of funds which is necessary.

The numerous advantages derived from the use of the bicycle, and its present popularity as a means of exercise and locomotion combine to remove from our path two formidable obstacles—training and equipment.

We have at hand a large and increasing number of soldiers provided with cycles and expert in their use, and it only requires a little tact and trouble to convert them into a valuable accessory to the army of this country.

Starting with the assumption that out of every British corps four per cent. can ride bicycles, and two per cent. are in possession of machines; and taking the present strength

at 70,000, we should have at this moment 1,400 machines and 2,800 cyclists available in case of war. Later on it is proposed to deal with the disposal of this force, while for the present we shall consider the different means employed by corps for the maintenance of cyclists.

As far as we can gather, in the majority of corps cyclists are tolerated, and in some even slightly encouraged, while in certain battalions they have a recognised status and are formed into a trained body, which has regular duties assigned to it on parade and in the field.

By the kindness of Lieutenant-Colonel Whitby, commanding the 2nd Battalion, Durham Light Infantry, I am able to give the following short summary of the system which he has brought to such perfection in the battalion under his command :—

(1) The club machines consist of thirty-five of regimental pattern (solid tyred) and fifteen of the pneumatic pattern. It may be mentioned in passing that the former are found to do much better for military purposes in this country than the latter.

(2) The above become the property of the men when paid for, but it is agreed (*vide* Appendix 1, Form of Application to join Club) that they are not to be sold out of the battalion.

(3) The machines are obtained direct from Messrs. Singer & Co., Coventry. The cash price being advanced by the commanding officer. The men paying for them by monthly instalments.

(4) The cyclists are used on the march for carrying messages, also as scouts and reconnoitering patrols.

(5) Beyond having their own bicycles to ride about on and being occasionally employed as paid cyclists, they are accorded no special privileges.

(6) When a man goes home his bicycle is bought by the battalion.

(7) There is a club, but at present no subscription to it.

(8) All cyclists do not attend parade as such.

The required number is specified in orders the day before, and only those detailed attend with their machines.

From personal experience and from what has been gathered from other sources, it seems to be an acknowledged fact that bicycle clubs, where the machines do not belong to individual members, are a mistake.

The system of organization proposed is—

(1) That each infantry battalion, cavalry regiment, and battery of artillery should be allowed by regulation to keep up a certain number of cyclists.

(2) That the number authorized for each unit should be obtained by calling for volunteers, from among whom the officer commanding should select his men.

(3) That the men so chosen should be provided with Government machines on the "Silladar" system, so that when a man goes home or breaks his machine while on duty he may not be a loser by the transaction.

(4) That all officially recognised bicyclists should appear on all parades with their machines, and be regularly exercised as such.

(5) In the case of small wars the cyclists of corps proceeding to a country, where bicycles might possibly be useless, would be transferred to form companies at advantageous points from which they could act on the surrounding country with advantage and replace cavalry ordered to the front.

(6) In the case of an important war each battalion left in India would have a cyclist company (1,400 machines or enough for 14 companies being estimated as available for this purpose) attached to it, with probably one or two volunteer sections in each. This company would be officered and organized like a company of mounted infantry and regularly exercised in patrolling duties, reconnaissance, and the exploration of the surrounding country; and would by this means save the cavalry as much as possible for cross-country work, and actual encounters with the enemy.

In support of what has been written above, it is urged that one of the most important studies for a soldier in India is the maintenance and improvement of the efficiency of its garrison. Whatever be the subject, whether health, training, mobility, or a number of others—all, it is held, are worthy of our consideration, and even soldier cyclists may add some little strength to the chain which enables us to hold back those who but for its restraining influence would endeavour to withdraw India from our protecting care.

APPENDIX I.

THE DURHAM LIGHT INFANTRY BICYCLING CLUB.

Form of Application to join the above Club, and terms of Agreement.

1. I, No....., 2nd Durham Light Infantry, am desirous of joining the above Club under the following conditions.

2. I hereby agree to deposit Rs. 50 (or Rs. 100, whatever they can) and to pay monthly a sum of about Rs. 20 to the above named Club until the full price of bicycle has been paid, commencing from the date of my first payment, towards the purchase of a bicycle.

3. I also agree that the bicycle shall remain the property of the Club until I shall have paid the full amount of purchase money, when the machine shall become my sole property.

4. I also agree that, if I do not complete the full payment within twelve months from this date, I shall be liable to forfeit all money already paid, and to have no further claim on the Club for a refund of any portion of the money paid by me, or on the property of the bicycle.

5. I understand that, unless the above monthly instalment be paid regularly, the bicycle may be withdrawn until arrears are paid up.

6. I further promise and agree to pay for and make good all damages caused to the bicycle, either through accident or from any other cause whilst the machine is in my charge until paid for.

7. I hereby promise that I will not sell or dispose of in any other way the regimental bicycle in my possession to any person not belonging to the 2nd Battalion, Durham Light Infantry.

8. I also promise not to transfer or sell my machine to another man without first acquainting the officer in charge of the bicycle section.

9. I further bind myself to conform to the rules laid down for the Club.

Signed at.....this.....day of.....

Signature.....

.....Colour Sergeant,

2nd Durham Light Infantry.

APPENDIX II.

The following gives the result of a bicycle race which took place at Poona on the 6th of August :—

Rs. 100 was offered for a competition between teams of four non-commissioned officers or men taken from any double company, squadron, or battery in the Bombay Presidency, and Rs. 40 was subsequently added for a second prize.

The conditions were that the teams should start at different times, and that the race should be decided by time. The time of a team being that of its last man.

The course was over the ordinary roads round Poona; certain well known points being fixed at which umpires were posted to see that the teams went the course, beyond which it was undefined, and any line could be followed to the named places.

The field was a small one, due chiefly to the fact that the Durham Light Infantry were known to be so good that no one cared to enter against them. When, therefore, the entries closed, it was found that this regiment alone had entered two teams which covered a distance of about 20 miles in the following excellent time:—

1st team	. . . . .	63 minutes, 19½ seconds.
2nd "	. . . . .	69 "

The men rode in uniform in the ordinary cycling dress of the battalion. No pneumatic tyred bicycles were allowed.

A COMPARISON BETWEEN THE INFANTRY MUSKETRY COURSE AND THE ARTILLERY PRACTICE COURSE.

BY MAJOR J. A. H. POLLOCK, 3RD SIKH INFANTRY.

In the following short paper I do not in any way wish to criticise the infantry musketry course. My main object is to point out that the present artillery course is a more practical one. One point I especially wish to point out is that enough attention is not paid to ranging at unknown distances. Owing to the small number of rounds available for field practices, unit commanders do not get enough training to enable them rapidly to pick up ranges and practice concentrating fire on certain objects.

It is with the object of improving the training in these points that I write these few lines.

In the infantry course very few rounds are available for practices at unknown ranges, and these rounds are not sufficient to make men good field shots and accurate judges of distance.

My regiment was allowed a year or two ago to fire a modified course of musketry of 80 rounds per man.

These rounds were expended as follows :—

5 rounds per man volley firing	.	.	800 yards.
5 " " " " "	.	.	600 "
5 " " " rapid volley firing	.	.	450 "
5 " " " independent firing	.	.	250 "

(The distances are only approximate, as the ground was quite unknown to the men. Some native officers and non-commissioned officers in each company had been previously trained with Labby's telemeter.) The company was first halted in extended order at about 800 yards from the targets and the distance taken with the range-finder. No. I Section fired with this sighting, and if incorrect, No. II Section fired with a higher or lower elevation and so on till the range was found, when the firing was concentrated on to named targets, the whistle being used when the target was to be changed. The range-finder was also used at 600 yards, but at 450 yards and 250 yards the range was checked by the shots.

All these practices were carried out under the company commanders—

10 rounds per man for half company attack from about 800 yards.

15 rounds per man for company field firing from about 1,200 yards.

15 rounds per man for half battalion field firing from about 1,700 yards.

20 rounds per man for battalion field firing from about 2,000 yards.

In each of these practices the men carried five rounds, the remaining rounds were on reserve mules, and the range-finder was used in all practices.

The unit commander carried out the practice in each case.

In the half battalion field firing, first and second lines were told off. In the battalion field firing, a third line was also told off, which during the attack was in position on both flanks, and afterwards moved up round the flanks and took up the pursuit of the retiring enemy. Casualties were freely made all through. I was very much struck with the quick way the ranges were picked up and the way the fire control and discipline improved with each practice.

Of course this was an exceptional opportunity, as the ground was frequently changed and so gave the men very varied practice. I cannot help thinking that if something of this kind could be introduced into the musketry course the shooting of regiments on service would show a marvellous improvement—in fact such an improvement that none but the best troops could face it.

There are many regiments which are most excellent at target practice when the ranges are accurately known, but have those regiments shown the same marked superiority under service conditions?

If not, then I think some alteration is required in our system of training.

The following is a short epitome of the artillery practice course:—

It is divided into four parts—

I. *Elementary*, which may be classed with our 1st and 2nd periods. The result of the shots are signalled.

One of the principal points is picking up unknown ranges; this is effected by putting out several targets and changing them or the position of the guns as soon as the elevation and

fuze have been correctly found. One day is devoted to ranging on a moving target.

II. *Battery Service Practice*, which may be classed with our field firing. No shots are signalled.

(1) Ranging is tested.

(2) The power of the battery in maintaining practice, the rapidity of its fire, and the effect it can produce.

Practice at a moving target is also carried out, and not less than one quarter of the ammunition is to be used for this purpose.

III. *Brigade Division Practice*.—This may be classed with our brigade field firing.

IV. *Competitive*.—We have no practice like this.

CONDITIONS.

Series I.

A four-gun battery in action at full interval, limber supply, the dummies representing each section. No dummy guns or limbers. Section commanders and gun detachments alone are represented.

Dummies, 6' × 2'.

Ranges.

			Yards.	Yards.
For group	I (horse and field artillery)	.	2,400 to	3,000
"	" II (mountain artillery)	.	1,600 "	2,000
"	" III (heavy artillery)	.	2,400 "	3,000

Series II.

A line of infantry represented by 45 standing dummies, each 6' × 2' at one yard apart.

Ranges.

				Yards.	Yards.
For group	I	.	.	1,800 to	2,400
"	" II	.	.	1,200 "	1,800
"	" III	.	.	1,800 "	2,400

Series III.

A line of infantry represented by 45 kneeling dummies, each 2' \times 2' at one yard interval.

Ranges.

	Yards.	Yards.
For group I.	1,200	to 1,800
" " II.	800	" 1,200

There should be at least 400 yards difference between each successive position.

Marks for fire discipline are given as follows for group I :

- (a) Bringing the battery into the position squarely and correctly, in good style, at the pace laid down in regulations, at equal intervals and with accurate dressing as far as the nature of the ground permits, with wagons and limbers in proper places and lids of ammunition boxes properly closed.
- (b) Drill and fire discipline, including capacity for command shown by the commander, correctness of words of command, steadiness, smartness, and quietness of drill.
- (c) Rate and regularity of fire.

In the first series range-takers must be employed.

In the second series they are optional.

In the third series they are not allowed.

Now I think if this is compared with our infantry course it will be found that the artillery course is the better of the two and more practical in nearly every way.

Their competitive practice, superintended by a Colonel on the Staff, Royal Artillery, appears to me to be a much more satisfactory test of efficiency than our figure of merit.

Could not our inspecting officers be required to test regiments on somewhat the same lines?

The infantry course might be worked on the same principle—

- I. *Elementary*.—Individual and collective practices on the range.
- II. *Service Practices*.—Attack and field firing, including moving target and volley firing at unknown ranges.
- III. *Competitive*.—A course laid down by authority, which would test the efficiency of regiments—to include moving target practice.

The moving target of the artillery is another point we might copy.

At present we only fire at a target moving across a space of 45 feet.

On service we may have to fire at an advancing or retiring enemy who may move at any pace from a quick march to a gallop, and yet our men are not trained to this.

A moving target could be used in most places in the plains: rope or wire and mules are required. Rope or wire can be bought from regimental funds, and mules at any rate in large stations might be requisitioned from the Transport Department.

All practice at moving targets should be with rapid volleys or independent firing to test fire discipline.

I do not suppose more rounds can be allowed to carry out these proposals, but I think the following rounds might be spared from the present allowance:—

From 2nd period (collective)—

5	rounds,	700	yards	volleys.
5	"	500	"	"
5	"	500	"	rapid volleys.
5	"	300	"	" "
—				
20	"			
—				

Miscellaneous and field practices—

10	rounds	moving.
10	"	attack.
—		
20	"	
—		

This could place at our disposal—

	Rounds.
2nd period	20
Miscellaneous and field practices	20
Company field firing	10
Battery or brigade field firing	10
Commanding officer's allowance	15
	—
Total	75
	—

These might be divided between service practice and competitive practice.

With these rounds expended in this way, the service efficiency of regiments would be increased to such an extent that men would have much more confidence in themselves, their rifles, and their unit commanders.

The firing of some regiments is still scarcely up to a satisfactory standard, and this course might be considered too forward for them. In that case the rounds for the competitive practice might be used for more range practice.

Again in some stations ground is not available off the range. In this case regiments could either fire more rounds on the range or be allowed to retain the rounds till an opportunity for carrying out these practices was available. Musketry is steadily getting more and more practical, but still the infantry course is behind instead of keeping up with that of the artillery.

I hope this paper may draw the attention of officers who are keen on having their regiments ready for service to the fact that we do not yet get the most efficient fire from our battalions, and that there is a good deal to be done before our men are trained up to the high standard that the artillery has reached.

- (1) A PLEA FOR THE INDIAN FENCING ASSOCIATION SUGGESTED BY THE LETTER OF LIEUTENANT F. C. LAING ON "THE ENCOURAGEMENT OF FENCING."
- (2) THE METHOD OF INSTRUCTION MOST SUITABLE TO MAKE OUR OFFICERS SWORDSMEN.

BY LIEUTENANT F. H. PIGOU, 1ST INFANTRY, HYDERABAD
CONTINGENT.

(1) Together with the author of the above mentioned letter I base my argument on the premise that a practical skill in the use of the sword is as necessary for the officer as it is in the use of the rifle and bayonet for the soldier in the ranks; but I do not think that the plan he suggests would be successful, until keenness for fencing and sword-play generally had taken hold on a greater number of the officers of our army.

This keenness will never come to a man who is forced to practice fencing against his will, but it does come to men who have been persuaded to try and learn, and have got through the drudgery of the beginning.

At the commencement, then, fencing must be made as pleasant as possible, and will be so made if officers in India will join the Indian Fencing Association in sufficient numbers.

The Association will make the acquisition of fencing a pleasure to its members by enabling them to get over the initial difficulties in 'on duty' classes at such pleasant places as Simla and Calcutta during the season.

These 'on duty' classes at the Central Schools will be held at Simla from the 15th of April to the 15th of October, and at Calcutta from the 15th November to the 31st March; each class will last three months; the subscription will be Rs. 16 per mensem for members attending the class, for which each member will receive six lessons a week, and the use of all fencing kit.

The entrance donation to the Association is Rs. 10; the annual subscription Rs. 2.

Rs. 20, plus the entrance donation, entitles the donor to membership for life without any further subscription, except of course that mentioned above for the special classes.

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These donations and subscriptions should be paid into the Delhi and London Bank, Simla.

The Honorary Secretary of the Association is Captain E. J. Medley, 17th Bengal Cavalry, Gilgit.

The Association publishes quarterly a magazine called "The Indian Fencing Review," which contains interesting letters from well-known masters of the science of arms, and is sent free to every subscriber.

The Association has far wider aims than the establishment of head-quarters' schools only, but to enumerate them all would make this letter much too long.

The Association is at present hampered by insufficient funds to meet the heavy rent demanded for a room suitable for a 'school of arms' at head-quarters, and I ask officers to become members and so remove this difficulty, assuring them from my own experience that by no other means can they become skilled in so fascinating and health-giving a pastime at so small a cost and in so pleasant a manner.

(2) The system of sword-play best adapted to Englishmen is that set forth by Captain Alfred Hutton in 'Cold Steel.'

To attain proficiency in that system, fencing and stick-drill must be learnt. The French method of fencing is that most closely allied to the above-mentioned system of sword-play: therefore the French method of fencing is the one for us.

The stick-drill should be similar to that laid down in the Infantry Sword Exercise, 1887, but be adapted to Captain Hutton's system of sword-play.

In a three months' course of six working days per week (as proposed by the Indian Fencing Association), four days a week should be given to fencing, two to stick-drill and 'moulinets' for the first two months.

(N.B.—These 'moulinets' should from the commencement be practiced using the actual weapon the individual intends to take on service.)

During the last month the instructor must use his judgment as to what is best for each individual pupil.

Fencing with the foil for us is only a 'means to an end,' *i.e.*, skill in the use of a cut and thrust sword. In conjunction with fencing, therefore, stick-drill should be assiduously practiced.

When the pupil can go through the advanced lessons with speed and accuracy, loose-play with foil or single-stick should be indulged in,—but this for a short while only after the

lesson,—until the pupil is able to work properly without thinking of the positions.

When steadiness and skill have been acquired in this the practice sabre should be used instead of the single-stick for loose-play, but the lessons should not be dropped, fencing and stick lessons being taken in the proportion of two fencing to one single-stick.

Sabre *versus* bayonet should be frequently practiced, weapons being changed after each hit.

Lastly—and this is a *sine quâ non*—each officer must be trained individually: training in squads is useless.

“Infantry Sword Exercise” should be abolished, and inspecting officers should see trained officers at loose-play with sabres, and sabre *versus* bayonet; and later on when in every regiment there are trained officers, each untrained officer at a lesson given by one of those trained. This training of one another will be most beneficial to both, and make the work of the schools lighter, as officers will then attend to be ‘finished’ instead of initiated.

TRAINING FOR VOLLEY FIRING.

BY CAPTAIN C. E. BADDELEY, R.E.

The year 1897 sees yet another musketry book issued for the use of the Native Army. Among the novelties introduced is a new practice in the "sectional" part of the annual course for cavalry and sappers and miners, *viz.*, "Individual firing by word of command." For some reason this practice does not form part of the course for the native infantry.

This practice resembles very much a system I have tried for several years as a "training" for volley firing and with good results, though from want of ammunition the system has never been thoroughly exploited.

In watching volleys fired at a target on the range, any one must be struck by the number of bullets missing the target, some going high and some low, and, in the case of a strong side wind, drifting to leeward of the target; it is extremely probable that the same men are repeating the same errors in each consecutive volley, but neither the section commander, nor any one else, can detect the individuals committing these faults, or in any way correct them.

In fact, firing ball ammunition in volleys on the range is, in great measure, a "test" of proficiency, and not a "training" at all. The "training" has really been done off the range, by instruction in aiming, by snapping, and firing volleys with blank.

As a "test" of the proficiency obtained by a section in volley firing, fewer rounds at each distance would suffice, probably three, and the rounds saved, together with a portion of the commandant's allowance, might be expended in a preliminary "training."

This "training" I have carried out as follows:—

The section being drawn up in the prescribed manner at any given range, one man only is given a ball cartridge, a couple of men to the right and left of him are given a round of blank each, while the remainder only snap. The whole section then comes to the "present" and fires a volley by word of command of the section commander. The effect of the one shot fired is carefully watched, and the position of the

hit (or miss) is explained to the man who fired the shot. If a miss, a second ball cartridge is given to the man, and another volley is fired. When the man has got on to the target, the next man is given a ball cartridge and so on. In this manner, the errors in aiming or in firing of each individual of a section can easily be detected and corrected.

When all have been practiced in this manner, a trial volley with ball may be fired, the men being reminded beforehand to remember carefully how they aimed.

I consider it very important that *at least* a couple of men, close to the man firing with ball, should be made to fire with blank. It makes the practice more nearly resemble an actual volley, and many men can fire excellently singly by word of command, who are put off in an actual volley by the *expected* discharge of rifles on each side of him.

In firing, especially volleys at moving targets, the above system is the only possible means I have found to get men to carry their aim well in front of the target, as each man can see for himself that he is bound to miss if he aims straight *at* the target, which is the great tendency in this practice.

By this manner of training, each individual's attention is secured, and he is made to feel how much the success of a volley depends on his own care. It accustoms each man to take pains, and to listen to the injunctions of his section commander as to how to deliver his fire.

I dare say this method of training is not new, and has often been carried out by other officers, but I must make it my excuse in writing the above that I have never seen it laid down, or recommended, anywhere.

PARTISANS AND BANDITS.

BY MAJOR A. C. YATE, 2ND BALUCHIS.

I did not intend to say more on this subject. I think, however, Captain Burton's remarks in the July number of the *Journal* demand a few words in reply.

Firstly.—He says my objection to the term "partisan operations" is sufficiently answered in the editorial note subjoined to my criticism. On this point I can only say that time must be the judge. Partisan, as I understand it, is a word always hitherto applied to irregular troops, and I think that "partisan warfare" is not a term that will be accepted by the military world as applicable to detached operations by regular troops.

"Partisan" in this latter sense is a French term, and the day when France dictated a military phraseology to Europe has gone by.

I admit that the word "raid" is not satisfying, but "partisan warfare," as I understand English, conveys no such meaning to my mind as Captain Burton would have it conveyed. Whether it will ever come to bear the meaning that Captain Burton would give to it, time alone, as I have said, can decide.

Secondly.—Whether we are or are not to apply the term "bandits" to the Spanish guerillas or partidas of the Peninsular War is a matter that well admits of difference of opinion. The word "bandit" would ordinarily carry the mind of an Englishman to tales of Italy, Sicily, Greece, Turkey, and Asia Minor, to memories of travellers waylaid, looted, and kidnapped, with the choice of death or ransom before them. "Bandits" are not men who act from any patriotic motive. Now the guerillas or partidas in the Peninsular War "were (to quote the words I used in my first note on 'partisan') whatever their character or mode of operations contributing to the great end of driving the French out of Spain." Napier, despite his strongly pronounced condemnation of the partidas, admits that they were a thorn in the side of the French (though "the French were never thwarted in any great object by these bands"), and concludes by remarking that through them the adversaries of the French (*i.e.*, British, Spanish, and

Portuguese) "could correspond by post and even by telegraph, an advantage equal to a reinforcement of 30,000 men."

In Napier, Book XI, chap. 2, we have a picture drawn of the mercilessness with which the war was carried on, by the French on one side, by the *partidas* on the other. The picture concludes with the words "the question of the treatment of prisoners was generally decided by granting no quarter on either side." If barbarity was a characteristic of the *partidas*, it was not, it seems, unreciprocated by the French. In recounting the ravages and massacres committed by the great scourges of mankind, such as Attila, Changiz Khan, Taimur-i-Lang, Nadir Shah, and others, historians do not apply to them the term "bandits." If the word bandit is to be applied to all whose operations have been characterised by "murder, robbery, and rapine," it will have to be very widely applied. What are we to say of the *condottieri* and free companies of the mediæval wars? And yet the command of these is associated with the names of two such distinguished English leaders as Sir John Hawkwood and Sir Walter Manny. Of Hawkwood, Hallam ("Europe in the Middle Ages," chap. iii, Part II) speaks as "the first real General of modern times; the earliest master, however imperfect, of Turenne and Wellington." My sentiment is to let *condottieri* be "*condottieri*" and *partidas* be "*partidas*," and not call them anything else. Any one who has read about the wars of the Middle Ages knows what *condottieri* are, and any one who has read about the Peninsular War knows what *partidas* are. General deMarbot applies the term "bandits" to them freely, but none the less he writes of the younger Mina "Il nous fit une guerre acharnée en Biscaye et en Navarre, à la tête de bandes qui s'élevèrent un moment au chiffre de dix mille hommes"—and of the elder Mina "Des officiers instruits, envoyés par la Junte de Seville étaient chargés de diriger ce nouveau chef, qui nous fit beaucoup de mal." Even Napier, in the midst of his denunciation of them, says: "There were certainly some who were actuated by nobler motives, by revenge, by a gallant enterprising spirit, or by an honest ambition;" and he then adds the names of fourteen of the principal leaders. Captain Burton speaks of Espoz y Mina as a brilliant exception to the others; but Napier, I find, says that "he shed the blood of his prisoners freely," and Marbot calls him "grossier forgeron, homme sanguinaire." So even the best of them were not immaculate, but still history has handed them down to us as "*partidas*," not "bandits." With

all their shortcomings, we cannot forget that these men were the descendants of the magnificent troops (the finest infantry then in Europe) who fought under Gonsalvo of Cordova and the Dukes of Alva and Parma, and of the adventurers who under Cortes and Pizarro achieved the conquest of Mexico and Peru.

In conclusion, I will quote one sentence from Prescott's Essay on Twing's conquest of Granada. He is speaking of the condition of Spain in the 15th and 16th centuries: "Even the peasantry (of Spain) assumed under this state of things a conscious dignity and importance, which are visible in their manners at this day, and it was in this class, *during the late French invasions, that the fire of antient patriotism revived with greatest force*, when it seemed almost extinct in the breasts of the degenerate nobles." This was written in October 1829, just sixteen years after Wellington drove Soult out of Spain, by one who knew Spain and the Spaniards well.

We must agree, we think, to let time decide whether "partisan warfare" is in future to be used as Captain Burton uses it or not.

HORSES, SADDLES, AND BRIDLES.

BY MAJOR WILLIAM H. CARTER, 6TH CAVALRY, ASSISTANT
ADJUTANT GENERAL, UNITED STATES ARMY. REVIEWED.

Through the courtesy of the author, this book has been added to the Institution library. Major Carter's design is to bring together in one book the points which it is of advantage to the cavalry officer to know in regard to the shape, feeding, saddling, bridling, and treating the ordinary ailments of the horse in quarters and in the field. The chapters on forage and treatment contain much the same information that is available in any of the handbooks that are in common use among us, and the same applies to the remarks of the author on conformation and aging.

The examples given of losses sustained in various campaigns are a warning of the disastrous effects of bad organisation and bad stable management. The loss of 58,000 out of 60,000 cavalry horses in Napoleon's Russian Campaign was nearly all due to starvation. When Murat complained to Nansouty that the charges were not delivered with vigour, the latter replied that horses have no patriotism; the men fight without bread, but the horses insist on oats. This is a reproach from which we are not free ourselves. In 1809 the Duke of Wellington complained of horses being starved; they had only got their grain ration three times in a month. And, again, in 1812, the loss from starvation of the horses and the exhausted condition of the remainder were among the causes that determined Wellington to retreat from Salamanca. In the Afghan War of 1838, the cavalry loss was from 40 to 60 per cent. during the thirteen months of the expedition. In the Crimea, it has been established that the losses from the 1st October 1854 to the 1st April 1855 (six months) of 47 per cent. in the heavy and 38 per cent. in the light brigade and 42 per cent. in the artillery were due to starvation.

The following figures, from Major Carter's book, will give an idea of the magnitude of the remount operations in a large war. The Giestorough depôt supplied only the army of the Sotomac, which contained but one-tenth of the cavalry on a

war footing, and the table takes no account of the twelve or thirteen thousand artillery horses handled here—

On hand, January 1st, 1864	15,721
Purchased from January 1st, 1864, to June 30th, 1865	5,326
Received from other depôts for issue	59,507
Received for recuperation, <i>i.e.</i> , sick and exhausted horses	85,980
Received by transfer from artillery	4,120

Total	170,654
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Issued to troops in the field	96,006
Issued to officers after June 30th, 1865	1,574
Sold	48,721
Died	24,321
On hand	32

Total	170,654
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Sorebacks, heelrope galls, that is, galls produced on the heels of the hind feet by the horse getting his hind foot caught in the headrope, and exhaustion also claim an appalling quota of victims among the horses from bad stable management and ignorance of how saddlery should be fitted. In 1882, we landed in Egypt from England 1,767 cavalry horses, of whom, in about three months, nearly one-fifth had died, been destroyed, or killed in action, and in one regiment there were 213 sick horses at one time from the causes above noted.

Major Carter devotes a very interesting chapter to the subject of biting and bits, and gives some capital diagrams of the bits in use with European nations, and a sketch showing the dimensions of the latest model of bit adopted by the United States Cavalry. This appears to be made according to scientific principles, which have been nowhere better discovered than in, if our memory serves us rightly, Major Dwyer's "Seats and Saddles." The lower cheek piece, $3\frac{1}{2}$ inches, is twice the length of the upper $\frac{3}{4}$ inch as it should be; the mouth pieces are made in three lengths—4 inches, $4\frac{1}{2}$ inches, and 5 inches; the width of the post, $2\frac{1}{2}$ inches, and its height, $\frac{3}{4}$ inch, are kept the same in all bits. The upper cheeks are slightly widened out to $5\frac{1}{2}$, $5\frac{3}{4}$, and 6 inches, according to the width of the mouth pieces. The measurements lately

taken of the width of the mouths of 592 horses of a regiment of Imperial Service Cavalry may prove of interest—

1	of	$5\frac{1}{2}$	inches.
4	"	$5\frac{1}{4}$	"
16	"	5	"
272	"	$4\frac{3}{4}$	"
299	"	$4\frac{1}{2}$	"

Of the measurements taken for a similar object of some American Cavalry, the author says only two horses came up to 5 inches and most were between $3\frac{3}{4}$ and $4\frac{1}{4}$, rather smaller than that of the country-breds quoted above.

The book will well repay perusal, and the author may be congratulated on having very fairly achieved the end he had in view.

ON SNOW PASSES.

BY CAPTAIN S. H. GODFREY, I.S.C., OFFICIATING POLITICAL AGENT,
GILGIT.

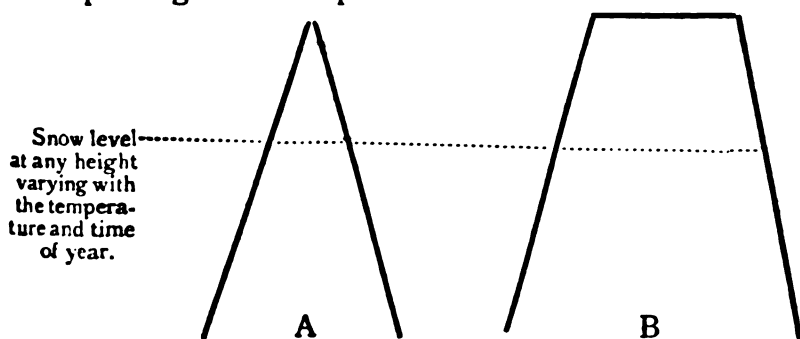
The secret of dealing successfully with mountain marches at high altitudes consists largely in the observance of two simple rules. The first is to watch the weather: the second to keep the feet warm. It must naturally often be difficult for any but trained eyes to detect at the foot of a chain of peaks and glaciers the slight indications of a coming snowstorm, or to realise from the safe shelter of a hut some thousands of feet below the summit that the blurred edge of the snow line above may mean a driving wind which it would be rash to face. From these facts two deductions may be drawn. In all doubtful weather the opinion of natives of the place should be consulted before the crossing is attempted. If troops are being sent in any but small numbers, the programme of the route should provide at least two or three days from which the officer in command can select a time at which the guides tell him the passage can be safely effected. Failing this, provisions may be exhausted and a hasty start necessitated, which will be repented of at leisure. The zone of high passes may, for practical purposes, be taken as the northern frontier of India, lying between and to the north of Peshawar on the east and Leh on the west. From the Panjab two routes run to Chitral. The most direct is that which leads over the Lowari Pass, 10,450'. A second but more frequented road for sending up small parties lies up the Khagan Valley, next over the Babusar Pass, 13,589' high, into Chilas, and thence by Gilgit and Gupis over the Shandur Pass (12,230') through Mastuj. A third route to Chitral, used mostly by the Kashmir Imperial Service Troops and individual British officers, connects Gilgit with Kashmir by the Tragbal, or Rajdiangan, 11,700', and the Burzil Passes, 13,500'. This road joins the Khagan Valley and Chilas route at Ramghat on the Indus. The road from Srinagar to Leh and to Gilgit *via* Skardu is only very occasionally had recourse to by any but

The writer has, at different seasons of the year, visited the Babusar, Burzil Karawal Dawan, Khardangla, Killik, Namyikala, Photula, Sasser, Tragbal, and Zojila Passes, varying from 11,300 to 18,000 feet.

Kashmir troops or travellers to Ladak or the Gilgit Agency. It crosses the Zojila (11,300') at the head of the Sind Valley. Between Kargil and Gilgit no further passes are met. Between Kargil and Leh two have to be traversed—the Namyikala, 13,000', and the Photula, 13,446'.

The high Himalayan Passes of the Karakoram, Mustagh, and Hindu Kush ranges, varying in elevation from 15,000' to 18,000', lead into foreign territory and lie beyond the posts garrisoned by Imperial or Imperial Service Troops. In the present instance it is proposed to touch only on those which have to be regularly considered on the relief of any of the garrisons in Gilgit and Chitral from Kashmir or India. Broadly speaking, all passes may be divided into two classes—those the summits of which meet practically at a point, the sides falling steeply away from the apex of the triangle, and those the approaches to which rise gradually and at the top of which is a long and a fairly level stretch of country. The Babusar Pass is an example of the former; the Burzil of the latter.

It will of course at once be clear that, other things being equal, the former class must be the easier to travel, except in summer, since snow will lie later at a high elevation than at a low one. It will too be obvious that with any given level of the snow line the distance of the roadway above the snow line must be greater on a flat topped pass than on a peaked one. A simple diagram will explain this at once—



The distance of roadway above the snow level at A is evidently less than that at B.

It is incorrect to suppose that passes can be entirely closed by snow. The term applies to general traffic and more specially to pack traffic. But such a phrase is not a misnomer from a military point of view, except where very small parties supplied with coolie transport is meant. Roughly speaking, the margin of safety for the passage of troops and

animals may be generally placed at from four to five months between June and October for passes of 15,000', and slightly longer for those over 11,000'. The pass will probably not be free from snow for even the whole of the shorter period. Where it is still left, the snow will, however, during the summer have become a semi-glacial mass, affording a fairly safe foothold to even laden animals.

Before June and after October a safe crossing for animals cannot be calculated upon. A hot sun in the day time, followed by heavy frost at night, will often render the surface so hard that horses may be taken over before sunrise with impunity. In this case the delay of an hour may be fatal to animals caught on the pass after the sun has attained power and the snow again becomes soft, for once the animals sink over their hocks they are lost. In any case the best time for a start is very early dawn.

At any time outside the margin of safety considerable precautions are necessary to guard against frost-bite. The chief desideratum is plenty of warm covering for the feet, disposed in several layers, none of which shall be so tight as to impede the free circulation of the blood. A close fitting ammunition boot worn with a thin sock, or, as sepoy occasionally do, with no socks at all, may easily forfeit the wearer's toes. Once the toes or feet are frozen, it is a mistake to place them near the fire. Circulation should be restored by friction with the hands or with snow well rubbed on to the affected part. The necessary foot-gear for the safe passage of snow in winter is not expensive or weighty. Rice grass shoes are easily made and are light and cheap. The feet should be well greased, and over them at least two pairs of woollen socks should be worn. If these are then covered with a well oiled pair of "Massis," or leather socks such as are made in Srinagar for two annas, and then bound well under the edge of the grass shoe, the sepoy may walk safely for several days in snow, which would certainly cause frost-bite were a tight leather boot and only one pair of socks employed. The preventive against frost is, as shewn, the retention of several layers of warm air round the foot. If "Massis" should not be obtainable, then one most excellent covering for the feet consists of an oblong bandage of thick puttoo or Kashmir homespun worn over a woollen sock. It is kept in its place by the spare end of the grass rope being wound several times round the ankle. This is the plan adopted by the postal runners on the Tragbal and Burzil Passes. The advantage of this form of bandage over a puttoo sock made to

fit the foot is that from its looseness it encloses a greater quantity of air, which is of course a good non-conductor. They require no fitting, are cheap, and a number of them can always be readily made or procured. The ordinary way of putting on grass shoes is to pass the rope at the toe between the great and the second toes. Though this method has certain advantages for rock climbing, it is not a necessity for snow passes, and the rope is apt to chafe the skin between the toes of men unaccustomed to this sort of foot-gear. The Central Asian merchants of Ladak wear long Russian boots fitting very loosely, with ample room for long stockings inside them. Should boots be worn, they ought to be well greased and sufficiently loose to enable two pairs of woollen socks to be worn. This extra size may render them less useful for ordinary purposes, and grass shoes, besides being far better, will therefore be economical in the end. Chaplis and native shoes of all descriptions are worse than useless in wet snow and of very doubtful value in dry. Once warmth is secured, it matters nothing whether the socks are wet or no. They can be dried at the camp fire. Every commander should see, too, not only that his sepoys have dressed themselves properly for snow-walking, but that the followers have done the same. It is extremely important that men should not start for a march over a snow pass on empty stomachs. Another point it is well to remember is that food is a far more efficacious restorative after exhaustion than stimulants, and some food should always be carried with the party to prevent delay in cooking when the men are likely to be over-fatigued, or the baggage delayed.

Most military readers will recollect that Skobelev, in his passage of the Balkans, made each soldier carry one small log of dry wood. This easily ignited and a fire was quickly made of green boughs that it would otherwise have been impossible to light. If a strong wind is blowing, the ears and hands should be protected ; and no man should ever start without his blue or green goggles, or else cases of snow blindness will occur. With these easy and inexpensive precautions and by following local advice as to the day and hour of starting, a safe passage of a formidable snow pass may often be made without incurring any really serious damage even in the late spring or early winter, and, should absolute necessity arise, even during winter itself. Without the safe-guards enumerated above, frost-bite is the least grave of the troubles that might quickly overtake a military force on a pass which would seem a simple affair to any practiced postal runner.

**SOME FOREIGN ARTICLES OF SPECIAL INTEREST
CONTRIBUTED BY THE INTELLIGENCE BRANCH.
TRANSLATED BY P. H.**

THE CZEIPEK FOLDING BICYCLE.

The last number of the "Journal of Artillery and Engineer Equipment" contains an extract from the "Revue de Cercle Militaire" on folding bicycles in the French Army. In a footnote the editor observes that it is of interest to note that a folding bicycle has also been patented in Servia. The author is apparently ignorant of the Austrian invention or the Austrian factory, although the bicycle in question has been thoroughly tested both at manœuvres and in our military colleges and found to work admirably.

Owing to the kindness of the well known "Styria" Bicycle Manufacturing Company, we are in a position to show that the folding bicycle has already been in use from some considerable length of time in our own army. The contrivance is an invention of the well known mechanic, Lieutenant Czeipek of the 22nd Infantry Regiment. The principle is a simple arrangement of a bolt so fixed that the bicycle folds in the centre and one wheel rests on another. The arrangement has been found to work perfectly and does not interfere in the least with the stability of the bicycle over rough ground.

The shoulder straps are attached to the cycle and the operation of shouldering is so simple that it occupies only some 30 seconds. It is very easy to carry, and experiments made showed that even weak men could march for several hours carrying the cycle without getting tired. Its weight is 30½ lbs. It does not interfere in the least with a man's shooting or getting into any position.

It takes even less time to unstrap and get ready to ride.

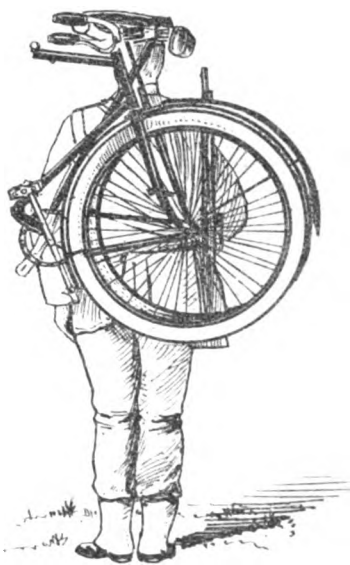
For screen reconnaissance work bicycle patrols will be undoubtedly most useful, more especially for the passage of defiles, villages, etc., in close country.

The system of attaching the rifle is also new. It is now fixed to the front bar in two carriers, barrel downwards, and in such a position that it can be taken off and replaced at a moment's notice.

The machine is so strongly and well-built that it answers all the requirements of service and be driven over steps, fields, etc., without injury.

The exercises performed by the Libenhasser cadets with both folding and ordinary bicycles proved the great advantage of the former, in that they could be used over any ground, while the latter were liable to damage and delay on meeting with obstacles.

Indeed the folding bicycle has been found so superior in every respect that it is highly probable it will shortly be universally adopted.



TRAINING AND EFFICIENCY OF THE TURKISH ARMY.

Very little is really known as regards the Turkish Army of to-day, it being assumed that, like the Empire, it is "diseased."

Irrespective of their marvellous performance in 1877-78, it must be remembered that for the last twenty years the army has been remodelled to a large extent by German officers, who, with General von der Gottz at their head, have remedied a great many defects.

Only a small number of the officers are recruited from the "Ruschdieh" and "Dadieh" schools, of which the former has four and the latter three classes, and both of which are similar to the German* technical schools. Cadets passing out

* German:—"Real-schulen." of these preliminary establishments attend the Mektel Harbieh, or military college, where they remain for three years, entering the army as Mu-

lazimsans, or Lieutenants. Most of the officers, however, rise direct from the ranks. The last annual list showed no less than 2,000 such officers serving as subalterns or even Bimbashis, which rank corresponds to that of a first class staff officer.

It is, therefore, easy to understand why theoretical training is still in its infancy, and how it is that no special regulations ever exist in the Turkish Army.

2. In the infantry and artillery, the French Regulations were adopted in the year 1875, having been translated into Turkish. Now the Prussian drill book is used for the artillery, and quite recently the German drill has been introduced for both arms.

Fortunately, the Turk is, as Prince Eugène stated, "a born soldier."

Even, in the present day, he is brought up as a soldier, and when he joins the service he possesses that true soldierly instinct fostered by the ordinary surroundings of his daily life, skirmishers with marauding parties and service along the frontier. All this takes the place of manœuvres, which are seldom held, and which consist mostly of drilling in close formation on a parade ground and some irregular target practice. For the latter a miserable allowance of five rounds per head annually is allowed.

Under these circumstances we can scarcely expect to find any tactical methods, or system of attack. Some specialities of the Turkish soldier are, however, well worth noticing.

Owing to the narrow roads, the infantry usually march two deep, and scarcely ever in column of any breadth. With true Turkish fatalism, no night manœuvres or surprises are even practiced, and their system of "security" on the march is confined to the usual advance and rear guards; flank guards, or such like precautions being entirely ignored.

3. During an attack, it is usual for the whole of the troops engaged to extend at once. The skirmishers advance, led by their commanders, showing great aptitude in making the best of the ground. They keep up a continuous fire, and are kept well in hand and together. A vigorous bayonet assault is finally delivered accompanied by the customary shout of "Allah."

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When acting on the defensive, the Turkish Infantry is most tenacious. They, however, open fire at very long ranges, and spend an immense amount of ammunition.

The cavalry only march in column, and, like the infantry, ignore all measures of security. In small reconnaissances and patrols, however, they are excellent; their only paces are the walk and an irregular gallop. They never trot. They usually attack in "swarms" and fire mounted.

Their field artillery is fairly well horsed, but the horses are badly groomed. It is, however, the best trained branch of the whole army, and their fire discipline and fire control is very good.

CAVALRY TACTICS AND ARMAMENT.

The following article appears in a French military paper in the form of a reply to a series of "Letters from a Cavalryman" which were published in the "Revue de Cavallerie," and as the question of arming cavalry with the lance or sabre has become a burning one in many armies, a reproduction of this article may prove instructive. The author states—

From his deductions on tactics, the author of "Letters from a Cavalryman" concludes that it is imperative to arm cuirassiers and dragoons with the lance. The matter resolves itself, according to him, into a question as to whether "the lance should be introduced, or whether the tactics of the French Cavalry should be changed"?

In view of a conflict with German Cavalry, France, having adopted the tactics of her traditional enemy, proposed also to adopt the same armament. Now, although there is doubtless a logical view to hold, would it not perhaps be better instead of following it out, as an unalterable principle, to enquire whether it would not be better to meet the tactics of the Germans, like the Russians, *vis.*, be prepared for the eventualities of a campaign, by the adoption of a totally different system of attack?

The author of the letters himself tends to this view in his reply to General Dongomieroff's objection to the lance when he says: "Dongomieroff tells us that cavalry must depend before everything upon the fury of their assault, and that they will be able to overcome the force of compact lines by the adoption of hand-to-hand fighting. For this reason he argues in favor of the sabre.

"It should be noted that France and Germany depend upon the force of a collision between compact lines. The whole of French tactics are based on the threatening or the delivery of such an attack, and therefore the weapon best adapted to this system must be adopted."

Asked why France and Germany have adopted these tactics, the author of these "letters" tells us that they are the precepts of such great minds as Frederic II., the Prince of Ligne, Moritz of Saxony, Napoleon, and the modern Generals—Wrangel, Frederic Charles, von Schmidt, and Gallifet.

Although we are just as little disinclined to undervalue these precepts as the Russians themselves, including Dongomieroff, it must be remembered that it is almost 150 years since the days of Frederic and almost a century since the days of Napoleon, and that as time is progressed, with the development of fire-arms, the extent of battle fields, and the general organization of modern armies, a change in tactics has been rendered imperative.

Whilst replying doubtless to those who urge short service as an argument against the adoption of the lance, the author of these "letters" argues that it is just this very short service and the unfrequency of war that necessitates the attack being delivered in solid compact lines, our young soldiers gaining more confidence by the feeling of attacking *en masse* and riding shoulder to shoulder. This solidity, though easy to insist upon, is far more difficult to carry out when we consider the enormous distances that will have to be crossed under fire in a future attack with modern fire-arms. We, therefore, are of opinion that it would be wiser to trust to the confusion caused by a vigorous assault than to insist on compact lines.

It is incomprehensible why the same lines have not been followed in the case of cavalry as in that of infantry, *viz.*, the substitution for an attack in close order by that in open order—a system based on short service and short training.

For our own part we are inclined to believe that short service requires some such system as that adopted by the Russians to the German tactics. The results, moreover, obtained by the German Cavalry with the lance are after all not so brilliant that France, although she may follow the *tactics* of the former, need religiously copy the armament of her rival. A proof of this is to be found in the remarks we find reprinted on the occasion of the Grand German Manœuvres of 1896 in the number of the "Revue de Cavallerie" following the one in which the author of "Letters from a Cavalryman" so warmly supports the lance. These remarks were taken mostly from military papers across the Rhine and include numerous arguments against the armament of the cavalry in general; and against the lance in particular.

Our conclusion is that the lance is by no means to be regarded as the one and only arm for the German Cavalry, and that very possibly the Emperor will, within a short time, change his opinion regarding this arm. It would, however, be most ridiculous if the German Cavalry were relieved of their lance and cuirasses just immediately after the French had adopted them.

Prize Essay Gold Medallists.

- 1872.....ROBERTS, Lieut.-Col. F. S., V.C., R.A.
 1873.....COLQUHOUN, Capt. J. A. S., R.A.
 1874.....COLQUHOUN, Capt. J. A. S., R.A.
 1879.....ST. JOHN, Maj. O. B. C., R.E.
 1880.....BARROW, Lieut. E. G., S.C.
 1882.....MASON, Lieut. A. H., R.E.
 1883.....COLLEN, Maj. E. H. H., S.C.
 1884.....BARROW, Capt. E. G., S.C.
 1887.....YATE, Lieut. A. C., S.C.
 1888.....MAUDE, Capt. F. N., R.E.
 YOUNG, Maj. G. F., S.C. (specially awarded a silver medal).
 1889.....DUFF, Capt. B., S.C.
 1890.....MAGUIRE, Capt. C. M., S.C.
 1891.....CARDEW, Lieut. F. G., S.C.
 1893.....BULLOCK, Maj. G. M., Devon. Regt.
 1894.....CARTER, Capt. F. C., Northumberland Fusiliers.
 1895.....NEVILLE, Lieut.-Col. J. P. C., S.C.
 1896.....BINGLEY, Capt. A. H., S.C.
 1897.....NAPIER, Capt. G. S. F., 2nd Bn. Oxfordshire Light Infantry.

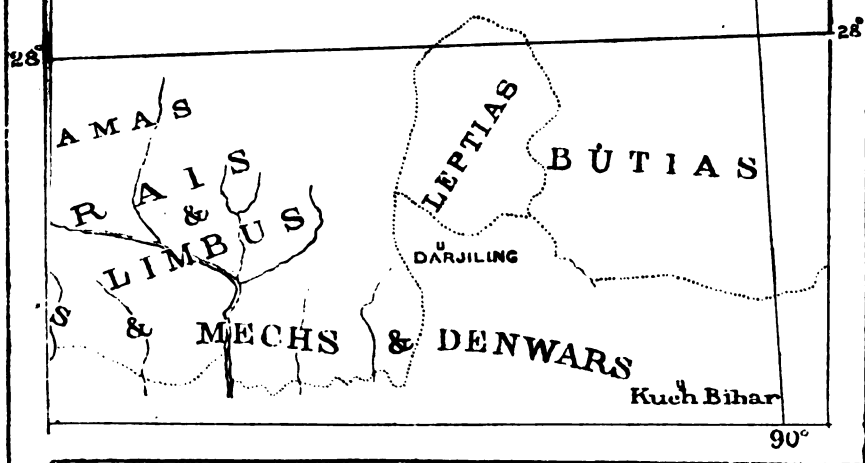
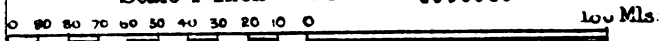
MacGregor Memorial Silver Medallists.

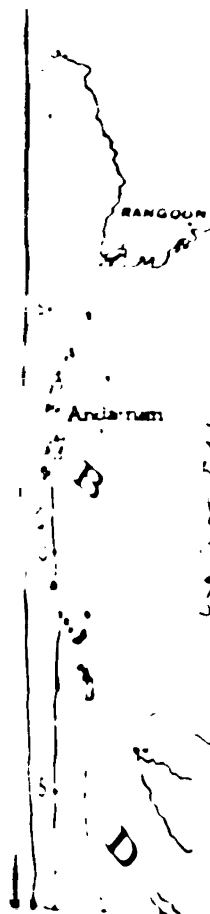
- 1889.....BELL, Col. M. S., V.C., R.E. (specially awarded a gold medal).
 1890.....YOUNGHUSBAND, Capt. F. E., K. Dn. Gds.
 1891.....SAWYER, Maj. H. A., S.C.
 1891.....RAMZAN KHAN, Havildar, 3rd Sikhs.
 1892.....VAUGHAN, Capt. H. B., S.C.
 1892.....JAGGAT SINGH, Havildar, 19th P. I.
 1893.....BOWER, Capt. H., S.C. (specially awarded a gold medal).
 1893.....FAZALDAD KHAN, Dafadar, 17th B. C.
 1894.....O'SULLIVAN, Maj. G. H. W., R.E.
 1894.....MULL SINGH, Sowar, 6th B. C.
 1895.....DAVIES, Capt., Oxfordshire Light Infy.
 1895.....GUNGA DYAL SINGH, Havildar, 2nd B. I.
 1896.....COCKERILL, Lieut. G. K., 28th P. I.
 1896.....GHULAM NABI, Private, Q. O. Corps of Guides.
 1897.....SWAYNE, Capt. E. J. E., 16th B. I.
 1897.....SHAHZAD MIR, Dafadar, 11th B. L.

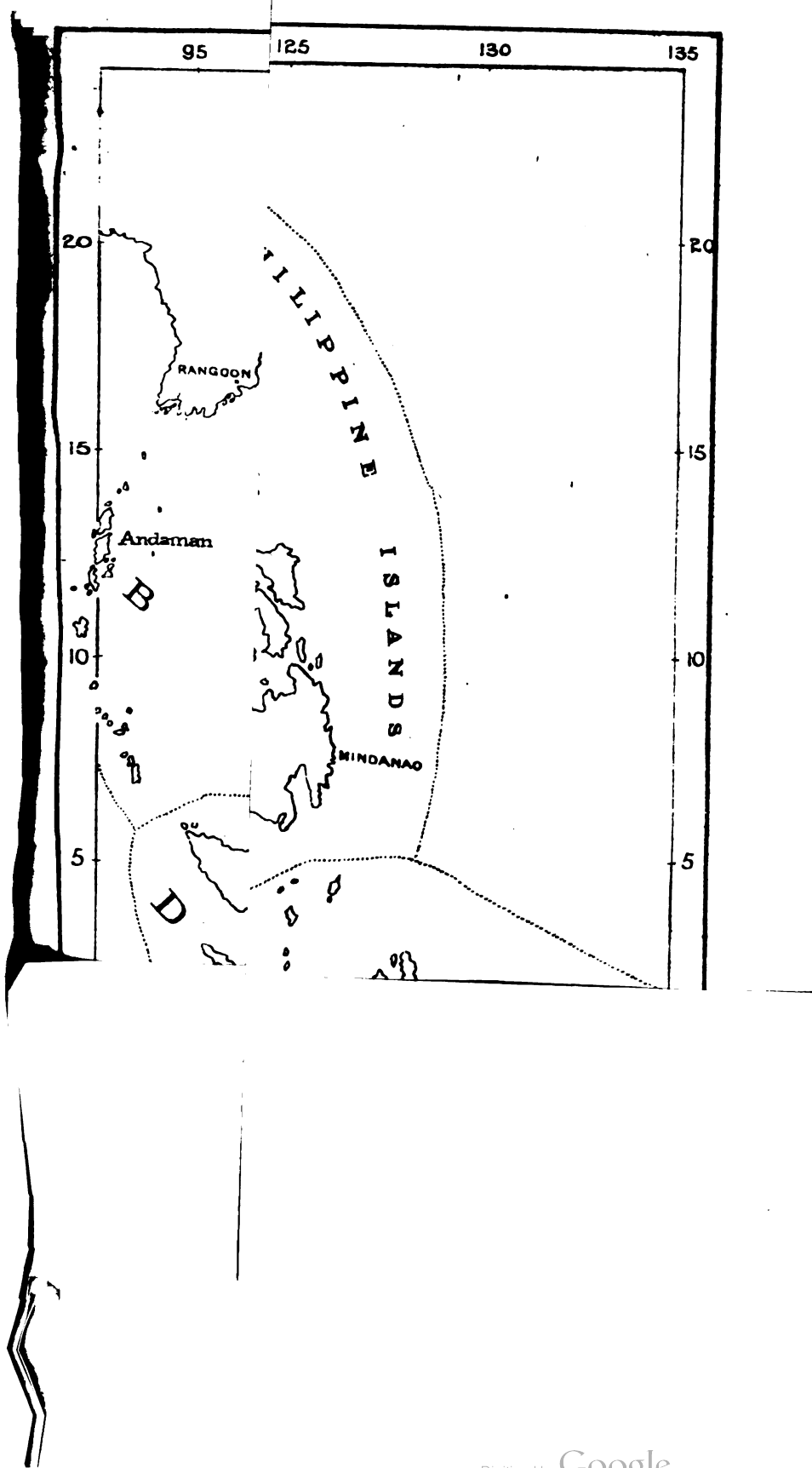
HIMALAYAN TRIBES

(OF INDIA PROPER).

Scale 1 Inch = 64 Miles

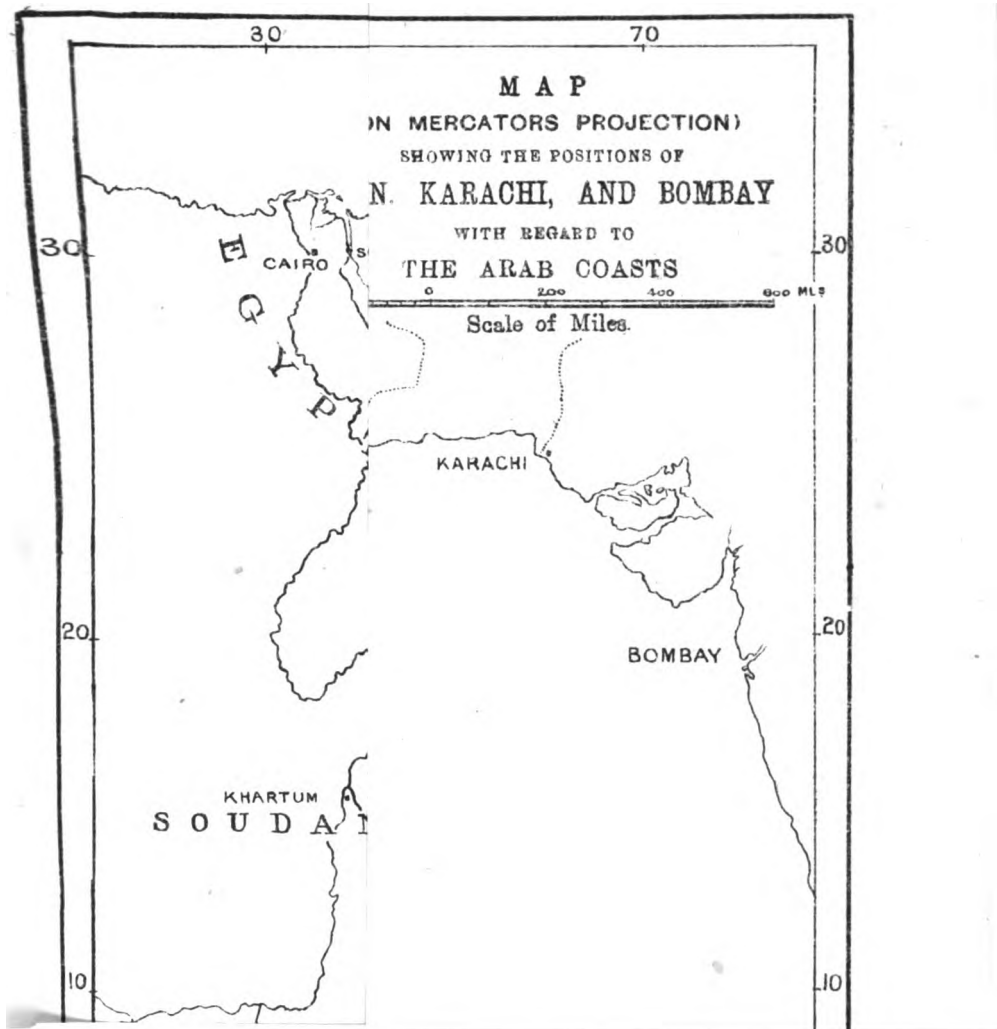


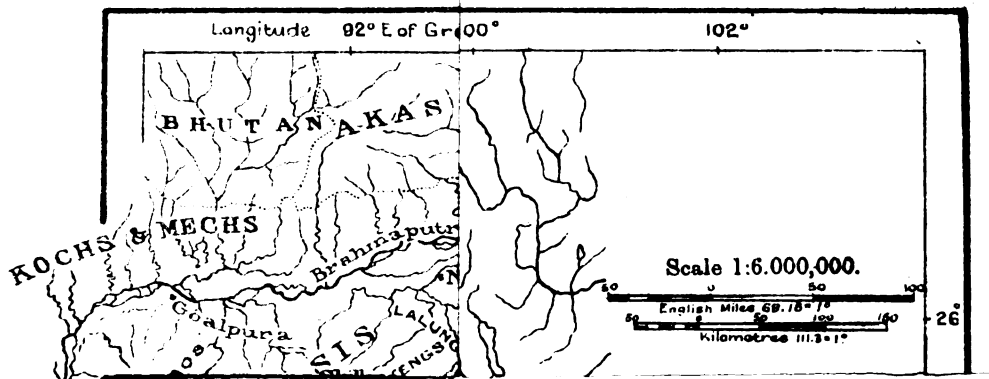




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